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Featuring

Arbitration

Annual Reports



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ARBITRATION

PRESIDENTIAL ADDRESS BY CHARLES B. BREED,* BOSTON SOCIETY OF CIVIL ENGINEERS, MARCH 20, 1929

AN engineer may naturally hesitate to enter into the discussion of a subject so definitely belonging to the legal profession. However, it may be to some extent excusable because of the fact that engineers are so frequently selected to act as arbitrators, and because they often find themselves without ready information at hand to guide and assist them with respect to the duties which they are expected to perform. In the past decade many circumstances and conditions have tended to draw our profession and the legal profession closer together, and to draw both of them closer to the business man. In the interchange of advice and expert opinion, the establishment of right principles for valuing and appraising properties, the drafting and supervising of construction contracts, and in the solving of an ever-increasing number of other problems, collaboration between the two professions has proceeded apace. Under these circumstances, therefore, and without much fear of criticism from my own profession, at least, I shall proceed to set forth in layman's language a few facts, gleaned to some extent from experience, in relation to the general subject of arbitration laws, together with a discussion of the trend and scope of current legislation in the premises. Some consideration will also be given to methods and conduct of procedure under arbitration statutes.

* Professor of Railway and Highway Transportation, Civil Engineering Department, Massachusetts Institute of Technology, Cambridge, Mass.

Every engineer who has had experience with construction contracts is familiar with the usual arbitration clauses which they contain. He therefore cannot fail to be interested in the present movement toward developing uniform "arbitration statutes" throughout the United States. The two chief factors or influences in this general endeavor are the American Bar Association and the American Arbitration Association, which latter association numbers among its honorary presidents no less personages than President Herbert C. Hoover and Hon. Charles Evans Hughes. It is both interesting and important to note that these two associations are not in accord upon the subject, and that their respective attitudes are diametrically opposed upon important fundamental principles.

The American Arbitration Association has recently drafted and promulgated a Draft State Arbitration Act, and to date has submitted it to the Legislatures of twenty-two states for enactment. The American Society of Civil Engineers, the American Institute of Architects, The Western Society of Engineers and over one hundred other leading engineering, technical, business and commercial associations have endorsed this act. A copy of it will be found in the Appendix herewith, at page 184.

The more important provisions of this act are as follows:

(1) When parties to a written contract agree to arbitrate *future* disputes arising thereunder, by the insertion of a clause to that effect, or agree in writing to submit to arbitration an existing dispute, such agreements are valid, irrevocable and enforceable.

(2) The Court will enforce such agreements, and if a party thereto fails, refuses or neglects to proceed with the arbitration when requested, the Court will require him to do so. Should a party fail to appoint an arbitrator in the manner agreed upon, the Court will make such appointment.

(3) When a party brings an action in Court upon a dispute arising out of a contract containing such an arbitration clause, the Court upon the application of a party will stay the trial of the action until the arbitration has been held.

(4) In order to expedite the proceedings, arbitrators are empowered to hold hearings, summon witnesses, and order the production of books and papers.

(5) Whenever a party refuses to comply with or perform an award, the Court will on application enter a judgment thereon, unless there is proof of misconduct or bias on the part of the arbitrator or that he has exceeded his authority, which judgment may be executed in the same

manner as any other judgment of the Court. The award is final as to the merits of the controversy, for the Court cannot review the facts or render a new decision. It can only determine whether the procedure has been held in accordance with the requirements of the statute; on these grounds only can the Court refuse to confirm the award and thus prevent the entry of judgment thereon.

Notice that this act possesses five cardinal points: (1) irrevocability of agreement; (2) security against litigation; (3) prevention of lapse or delay in proceedings; (4) preservation of the integrity of the arbitration and enforcement of an award; (5) limitation of review by the Court to procedure only.

It is obvious that such an act puts the Court squarely behind the arbitration, and makes the decision of the arbitrator (or arbitrators) final unless he has exceeded his authority or has permitted himself to become biased or corrupted.

Such an act is based on the theory that if the parties to a written contract mutually desire to forego certain legal rights they have a complete right to do so; that is, they may by agreement forego the right to litigate both future and present controversies in a court of law. In agreeing to arbitrate thus, they may deliberately substitute an informed expert for a judge and jury (who might have no expert knowledge of the matter in controversy), and eliminate application of the rather strict and technical rules of legal practice as established in the State and Federal Courts. Unless specifically reserved to the Court by the arbitration clause (and the act does not seem to preclude such a reservation) the arbitrator determines questions of law as well as fact. If a party desires to retain any legal rights which would otherwise be relinquished by such an agreement to arbitrate, he should do so in explicit terms, both in the arbitration clause of the contract and in the Submission; the latter being a specific statement of the questions involved in the particular controversy to be arbitrated.

Before proceeding to consider, on the other hand, that type of legislation in the premises which the American Bar Association has approved for enactment by the various states, and which has also been reduced to the form of a draft act (see Appendix, at page 188), it is important to point out its radical and fundamental difference from the act sponsored by the American Arbitration Association. The rock upon which the two associations split is this. The American Arbitration Association's act permits of and makes enforceable an agreement to arbitrate controversies *which may arise in the future*, and consequently which cannot be known or foreseen when the agreement is made, as well as contro-

versies existing at the time of the agreement. The American Bar Association's act permits of and makes enforceable only such controversies as *exist at the time the agreement is entered into*, and provides for no enforcement of an agreement to arbitrate future disputes. The Bar Association act also permits the arbitrator upon his own motion or at the request of either party to submit questions of law to the Court for its final determination.

Whereas there may be practical merits on both sides of this controversy, it is obvious that it will mean a big difference to general business in which direction such legislation in the various states progresses, and how the application of these respective laws works out in practice.

The attitude of the American Bar Association in the matter is historically interesting. In 1924 the present Federal Arbitration Law having been proposed, it was referred by the Bar Association to its Committee on Commerce, Trade and Commercial Law. It included the principle and provision that agreements to arbitrate disputes arising in the *future* were permissible and should be enforced. After due consideration, the committee recommended the act and the Bar Association adopted the recommendation. The same committee caused this act to be proposed to Congress, and was instrumental in having it enacted by the unanimous concurrence of both the Senate and House of Representatives in 1925. In so doing the approval of the American Bar Association was consistently urged.

In the meanwhile the American Bar Association had requested the National Conference of Commissioners on Uniform State Laws to consider the matter of commercial arbitration laws and to report back to the Bar Association, through a committee of the National Conference of Commissioners (which committee was in substance a committee of the American Bar Association), a uniform arbitration act which the Bar Association might adopt and recommend for passage to all State Legislatures. Incidentally the National Conference of Commissioners on Uniform State Laws is a body composed of representative attorneys from every state, who are chosen under state statutes for the purpose of developing uniformity in state laws. They meet annually with the American Bar Association and are an adjunct of that association. The committee of the National Conference reported to the Bar Association in 1924 a proposed act called the Uniform Arbitration Act, but the report was not considered by the Bar Association at its 1924 session on account of certain procedural technicalities, and was referred back again to the committee. At the annual session of the American Bar Association in 1925, and subsequent to the passage by Congress of the Federal

act, the Uniform Arbitration Act, sponsored by the committee of the National Conference of Commissioners on Uniform State Laws, was again reported for consideration by the Bar Association.

By that time this proposed act had been under consideration by the National Conference Committee for four years. It had been considered and voted upon by the National Conference Commissioners, who represented the various states, and had been adopted by the latter on a state vote of 30 to 5. The discussion which this matter developed was considerable and sometimes bitter. Even among the three commissioners representing Massachusetts, one, Mr. Hollis R. Bailey, took the position that the conference should not oppose in its state act the policy already adopted by the American Bar Association with respect to the Federal act (containing the New York and New Jersey idea); another, Prof. Samuel Williston of Harvard, favored many of the principles of the New York and Federal acts, and questioned whether the Uniform Arbitration Act sponsored by the National Conference Committee was much of a step in advance of the law on the subject already in existence; and Mr. Joseph F. O'Connell, the third commissioner from Massachusetts, was strongly in favor of the act sponsored by the National Conference Committee. The act itself is very similar to that of the statute of Illinois, which is limited to *existing* disputes only, and leaves considerable jurisdiction to the Courts on matters of law, and the National Conference Committee seemed to feel that it would be impossible to get the American Bar Association to adopt any state act embodying the principles of the Federal and New York acts, because the middle western and western members of the National Conference were strongly opposed to anything of the sort and favored the Illinois type of act.

After a rather heated debate, the American Bar Association voted to adopt the Uniform Arbitration Act proposed by the Conference Committee by a vote of 175 to 26. Thus the Bar Association in substance reversed the action it had taken on the occasion when it had approved the Federal act, which is almost identical with the New York act. The proponents of the New York idea felt that an act similar to the New York act should have been adopted by the Bar Association, and took the position that this apparent reversal of attitude on the part of that association was unfortunate, inconsistent and stultifying; that it placed the Bar Association in the position of practically admitting to Congress that its former attitude in recommending passage of the Federal act was all wrong; and that the country as a whole would tend to lose confidence both in lawyers, as such, and the American Bar Association, if they could not hold to their views any longer than that. The following references

are given for those who might wish to read the full discussions which took place, viz.: Handbook of the National Conference of Commissioners on Uniform State Laws and Procedure, 1924 Edition, pages 60-133; Handbook of the National Conference of Commissioners on Uniform State Laws and Procedure, 1925 Edition, pages 62-81; Report of American Bar Association, 1925 Edition, Vol. I, pages 135-162, 577, 582-587.

To summarize the two respective views of the American Arbitration Association and the American Bar Association briefly. The Arbitration Association insists upon the inclusion and enforcement of contractual stipulations to arbitrate both present existing and future controversies, as provided for in the act which they propose and endorse. It also insists that the award of the arbitrator shall be final. This position is justified, they say, for the following reasons: (1) modern business organization requires an expeditious and elastic method of settling business disputes; (2) the speed and cost of business transactions require security against the delays and expense of litigation; (3) business is helped by a private settlement of a controversy which does not damage publicly the commodity itself nor the reputation of the firm involved; (4) business wants its disputes settled by business experts and not by juries; (5) business needs its disputes settled at the convenience of the parties, not at the convenience of the courts.

The position of the American Bar Association, on the other hand, is the following. Agreements to arbitrate existing disputes should be enforced, always, however, subject, at the instance of the arbitrator or either of the parties, to having questions of law decided by the Court. Agreements to arbitrate future disputes should not be enforced because: (1) the ignorant and hasty should be protected against entering into such agreements, which they might not appreciate; (2) it would be placing power in the hands of men controlling business and credit organizations of the great cities, to require persons of lesser standing, who perforce have to do business with them, to accept such a provision whether they desired to do so or not, hence permitting a species of duress for the waiver of constitutional rights.

Present Status of Legislation. — Having thus discussed the two schools of thought actively represented in the present movement toward making uniform the laws of the different states with respect to commercial arbitration, it is pertinent next to review briefly the present state of such legislation. In addition to the arbitration act passed by Congress in 1925, and which applies only to disputes arising out of interstate and foreign commerce, or maritime transactions, involving sums over \$3,000, there are today only twelve states which have arbitration acts upon their

statute books. These states are: New York, New Jersey, Massachusetts, Illinois, California, Pennsylvania, Oregon, Utah, Wyoming, North Carolina, Nevada and Louisiana. There is no uniformity with respect to these twelve acts. Both the American Bar Association and the American Arbitration Association schools of thought are represented. There are also important differences in many of the acts on the one side or the other of the main points of difference betwixt these two schools of thought. Thus we find that the acts in the states of Illinois, Utah, Wyoming, North Carolina and Nevada are directed and confined to the enforcing of arbitration agreements respecting *existing disputes only*, with a reserved right to have matters of law passed upon by the Courts at the instance of the parties or the arbitrator. In four of the five states last named the uniform act endorsed by the American Bar Association has been adopted without modification. In the States of New York, New Jersey, Massachusetts, California, Pennsylvania, Oregon and Louisiana, such agreements with respect to both present *existing* and *future* disputes are enforceable, and thus the statutes of these seven states are in accord with the general principle embodied in the act endorsed by the American Arbitration Association. The acts of New York and New Jersey are almost identical in terms. The still more recent statutes of California and Pennsylvania are very similar. The Massachusetts act, although covering both existing and future disputes, differs essentially in several important respects from the New York statute. The differences between these two latter statutes has been comprehensively treated by Mr. Richard C. Curtis of the Boston Bar in an article which appeared in the October, 1927, edition of the American Bar Association Journal (pages 567-570). All of these statutes have been passed since 1920, when the New York statute was enacted, which is indicative of the popular demand for such legislation. There can be no doubt that if business insists upon arbitration statutes, it will only be a question of what is the best form of act.

The Massachusetts statute was passed in 1925. When originally proposed, and considered and rejected by the Judiciary Committee of the Massachusetts Legislature, it was very similar to the New York statute. Governor Fuller sent it back to the committee for reconsideration, where it was revised, reported upon favorably and enacted into law. Like the New York statute, it includes future as well as existing disputes, but provides for certain recourse to the Courts which is not provided by the New York statute.

Thus we see that legislation with respect to arbitration agreements is comparatively in its infancy and, unfortunately enough, is headed in two different directions. Modern business is seeking the establish-

ment of a new forum in which adjudication and adjustment of its multitudinous and intricate controversies may be accomplished in a business manner as distinguished from a legal manner. Age-old usages and customs, ancient and traditional rules of procedure, the somewhat antiquated and slow-moving machinery of our court system, are to be to some extent supplanted by direct, unimpeded and intelligent business methods. The controversies of commerce are to be elevated to the distinction of "business matters to be worked out" rather than left as material for lawsuits and litigation.

As members of a profession which since the inception of this modern movement has been drafted to assist in its development, and which is bound to play an ever-increasing part as the movement spreads and progresses, it seems only fitting that we should keep ourselves acquainted with its many phases, and to some extent interest ourselves in helping to encourage and produce a uniformity which the importance of this subject warrants and makes almost necessary.

The following thoughts are therefore addressed to the general subject of arbitration.

General Observations on Arbitration. — The arbitration clause of construction contracts as a rule merely states that if the parties are unable mutually to agree upon the settlement of a controversy that may arise out of the contract, either party may request an arbitration of the controversy, and the manner of appointing the arbitrators and other details are then recited.

But such arbitration clauses, though valid, are of little value in most jurisdictions, for they lack provision for enforcement. They can just as easily be repudiated by either party to the contract as can any other clause in the contract. Their performance rests solely on the good faith of both parties.

Less than a decade ago effective arbitration statutes in the modern sense did not exist, and in all of the states there prevailed the common-law theory that any agreement to arbitrate could be revoked by either party at any time before an award was made, because, since they considered all questions of law and fact, "they ousted the jurisdiction of the Courts," a law inherited from the Colonies. These usual arbitration clauses possessed the common-law doctrine which allowed them to be broken to the same extent as any ordinary contract can be broken, and that is the antiquated doctrine which prevails today in most of the States of the Union.

Under the common-law doctrine any binding contract may be broken by a contracting party, but if he does it he is subject to suit and

liability in damages. If, therefore, he breaks the contract to arbitrate, the only remedy the aggrieved party has, since the Courts will not give specific performance to such a contract, is to sue for damages in Court, which substantially means that he admits that he is injured by being obliged to submit the controversy to the Court rather than to arbitration. Obviously he cannot show that this has injured him to any extent, and consequently it is difficult for him to obtain anything greater than nominal damages. The main controversy can still be litigated in Court.

Contract to arbitrate, whether under the common law or under statutes, is valid, irrevocable and enforceable in the same manner as any other agreement would be under the same laws. This applies to future as well as existing disputes. The fact that the contract was binding and irrevocable would not prevent its breach by refusing to arbitrate or by revoking the authority of an arbitrator, and if this took place the injured party could get only nominal damages. But if a contract to arbitrate is made a condition precedent to receiving money, then the Courts hold that the arbitration must be held and award made before the Court will determine the other issues. For example, if payment of insurance money in settlement of damages by fire is demanded in Court and the insurance policy states that the amount of a loss shall be determined by arbitration, and that this is a condition precedent to receiving any money, then the Court will not enter judgment until it receives the arbitrator's award.

Arbitration acts avoid this difficulty by making arbitration a condition precedent to Court action; that is, they provide that until arbitration and award there shall be no right of action for breach of the main premises of the contract.

The really effective sections of the Draft Act endorsed by the American Arbitration Association are sections 3, 4 and 5, especially section 3, which in effect confines any right on the contract to the arbitration and award unless both parties wish to drop the arbitration. Section 4 gives the arbitrator needed power in the course of the hearing. Section 5 provides a somewhat more summary method of giving the award the effect of a judgment in Court than would otherwise be possible.

Reference to an arbitration statute by title or chapter of the state laws is unnecessary in the arbitration clause of a contract, because the courts would enforce agreements in accordance with the statute without reference thereto. What an arbitration statute really says is that when two parties have agreed to arbitrate their differences the state will enforce the agreement for them.

The English precedent of 1833, making an arbitration agreement enforceable if the Submission were made a rule of the Court having juris-

diction over the parties, was included in some of the state laws. But New York followed the English statute of 1889, which upheld an agreement to arbitrate either an existing dispute or one that might subsequently arise out of the relation of the parties in any given contract.

To some lawyers the only advantage in an arbitration act like New York is speed. The claim seems to be that the only way to guarantee complete impartiality and to have correct principles of law applied is by litigation in the Courts. To some extent this may be true, but it is predicated upon the assumption that the law is needed to settle all disputes. Many disputes are settled by compromise in and out of attorneys' offices, with little or no regard for applicable legal principles. If compromise is a suitable instrument, why may not also be arbitration? To the layman the law as administered by the Courts seems unjust in certain cases; it seems admirably fitted to other cases. Arbitration can never be a substitute for the Court in a wide field of matters. To the hustling business man slow-moving litigation is a most unbusinesslike procedure because so wasteful of time which is money to him. Many of his controversies are merely a failure in meeting of minds, matters of judgment concerning quality of materials and workmanship, or they may relate wholly to the science or art of construction. Rather than afford the valuable time the Courts will consume, he has often submitted to what he feels is an unjust compromise of a controversy. He naturally welcomes an arbitration of his difficulties that will be impartial, just and final; believes himself capable of mutually agreeing with his opponent upon a man who will be impartial and just; prefers that the award of that man shall be final, and is grateful for such arbitrator's service.

Arbitration, then, is intended to be a voluntary legal procedure which provides a prompt, impartial, relatively inexpensive method of final settlement of a dispute.

Comparing arbitration with litigation the two practices are different in these respects: A resort to litigation implies that a party desires to obtain the maximum of his rights according to the technicality of the law, and to be vindicated as a matter of public record in his contention. The object of arbitration is justice to all concerned as well as the maintenance of commercial peace. It aims to prevent ill-will and to preserve good-will. It is a substitute for litigation.

Business men do not have to resort to arbitration if they do not want to, but if they insert an arbitration clause in their contract, that clause ought to be binding and enforceable like any other of its provisions. They need not put such a clause in their contract if they do not want to. But apparently they want to do it so as to be sure of eliminating

the delays of litigation and the unpleasant experience often incident to Court trials. Arbitration statutes of the New York type merely provide that if business men choose to make a contract to the effect that they will arbitrate their disputes, they shall be bound by it. The business men of the country say that they find value in this type of law; that it tends to raise the standard of commercial honor. It is agreeable to those men who intend to observe their contracts, although viewed unfavorably by those who intend to break them if they choose. One objection raised to the so-called Uniform Arbitration Act adopted by the American Bar Association is that it permits legal jockeying and Court delays, which is the very thing that business is attempting to avoid. besides, of course, being limited to enforcing arbitration clauses covering existing disputes only.

The thing which has forced commercial arbitration is the rapidity with which American business is being done, and the cumbersome, slow methods of the Courts, which have not kept pace with the hour values of commercial development. This is not reflection upon the Courts or the lawyers. It does not mean that business men have lost confidence in either. It does mean, however, that business men are impatient with what they are coming to regard as unnecessary delays, and are willing to take a chance on the final settlement of their disputes by a fair-minded arbitrator of their own choosing, even though he may not in any sense be learned in the law. They feel that his judgment may be as close to justice as the application of the very finest principles of law would be. They realize that he is fallible and may make mistakes. They also know that even Courts reverse their rulings, and that there is plenty of risk in a Court action. On the whole, they are becoming more willing to accept the prompt and final decision of an arbitrator because it means a speedy settlement of disputes, releases money quickly for business uses, and tends toward commercial peace.

The law has for many years given the business man a right to arbitrate his difficulty, but under the common law appeals to the Court were possible, with consequent delays. This fell far short of his requirements.

The business man views with favor an agreement in certain contracts to arbitrate future as well as existing disputes, and he wants such agreements enforceable. His business experience tells him the types of disputes he will be liable to encounter, and he realizes that they are usually of a nature not fitted to just settlement in a court of law, but more likely to be fairly and promptly adjudicated by some one experienced in matters pertaining to the business or transaction in question. That being true, why should the state not pass a law making such an agreement

enforceable, and thus enable him and his business associates to settle certain disputes in their own way?

In the last sentence the word "certain" is used purposely, for it is by no means the view of the writer that all disputes should be left to arbitration. And for the same reason not every construction contract should include a clause to the effect that all disputes subsequently arising out of the contract shall be left to arbitration under a state law like that of New York. In certain contracts and in certain business transactions it is good judgment to include in the contracts a clause to that effect. In others it is wise to omit such a clause, leaving the application for arbitration a matter to be resorted to after the disagreement has arisen, by the mutual separate act of the parties involved, if they both choose to arbitrate rather than resort to court action. In still other contracts the engineer's decision should be final and a condition precedent to receiving payment. I believe, however, that it is wise, when arbitration is agreed to, to make it a final adjudication of the difficulty, and that the state laws should provide a means to this end. In other words, it is the view of the writer that an arbitration should be a finality and not develop into a lawsuit, and that every state should have a law which will accomplish that end.

The controversies, then, which should be arbitrated are those having no place in Court because they involve little or no law, but pertain almost wholly to the trade customs, science or art, about which courts and juries would probably be ignorant. An engineer arbitrator on a controversy involving complicated law, even though the law is explained to him, may incorrectly apply the law to the facts and consequently innocently render an unjust award.

Similarly, a Court adjudicating a controversy arising from a construction contract may be so ignorant of the science of the type of construction at issue as to be wholly at sea when conflicting testimony is given, as often happens, and incapable of determining which testimony to believe and which to reject. It may just as readily adopt the fallacious testimony as fact, and then apply the law correctly. Such an award will obviously result in injustice. One illustration will suffice. Two judges of one of our higher courts sat on a jury-waived tort case where alleged damages were claimed by a contractor for error in the amount paid him for earth excavation placed in a dam. According to the contract, the earth was to be measured in the borrow pit, and payments at a unit price were to be made based upon this measurement. The final quantity seemed too small to the contractor. His engineer had not taken cross sections on the original ground at the borrow pit, and so was unable to

compute the amount actually removed from the borrow pit and placed in the dam. He found, however, that the actual amount in place, measured in the dam, was about equal to the final estimate, and naturally concluded that there must have been many more cubic yards actually excavated from the pit because it was consolidated by artificial means as it was placed in layers on the dam. This evidence he gave in Court. He also gave his judgment as an expert of the percentage of shrinkage. The judges sitting on the case disbelieved him. They knew perfectly well that the earth as it lay on the hill against which the storms had beaten for centuries, and upon which massive forests had lived, must have been consolidated fully as much as it could have been when rolled in layers on the dam, and they consequently were inclined as well to disbelieve all the rest of the testimony that engineer gave. They gave a decision in favor of the defendant. Injustice was plainly done through ignorance. Had an engineer of experience adjudicated the case such an error would not have been made. This case is typical of the kind that should be adjudicated by arbitration to a finality, for it runs the risk of an unjust decision from a Court which may be infallible in its knowledge of legal principles.

The principal discussion and controversy in legal circles centers around the question as to whether or not in arbitration acts controversies which may arise in the future shall be included, or only existing controversies; and as to whether or not in any event the arbitrator shall have authority to pass upon the law or shall be required to refer it to the Court for interpretation. There seems to be an agreement of minds that an act must be valid, irrevocable and enforceable. To the writer it seems that the difficulty of adopting any uniform arbitration act lies in the fact that it appears to be regarded by so many legal minds that such an act must apply to all kinds of controversies. It is difficult to understand why there might not be, for example, in the laws of every state, an arbitration act similar to the New York act for the purpose of settling future and existing disputes not inherently involving intricate legal questions, and another one similar to the Uniform Arbitration Act endorsed by the American Bar Association, confined to the arbitration of those existing disputes which involve legal questions. This would give contracting parties an opportunity to insert an arbitration clause of the type suitable for the particular contract. It may be claimed that this is impracticable, but it would, I think, if it could be made practicable, fill the real need.

Uniformity, in any event, is certainly desirable, so that arbitration agreements will be enforced in all states and the procedures be alike. For some contracts the New York type of act ought to be available, for others, the Bar Association type.

The most serious problem in commercial arbitration is the possibility of error in applying the law to the facts, and in the possible lack of knowledge on the part of the arbitrator of what the law is. With reference to this, modern statutes are divided. Some take the position that such errors should be reviewed by the Courts; others take the view that if this is done the door is thereby opened to the delays of Court procedure, and thus the chief aim of arbitration is effectively defeated. The Massachusetts statute avoids the difficulty by providing that both parties may agree that the arbitrator shall refer any question of law to the Court, and also that upon the application of either party before the award becomes final, the Court at its discretion may instruct the arbitrator upon any question of substantive law.

Modern civilization is based upon the doctrine that security of life, liberty and property ultimately depends upon the accurate and consistent application of previously existing rules of law to facts as they arise. The oriental idea is the application of facts to any rule of law, whether pre-existent or not, which seems most appropriate to the judges at the time of decision. The modern judge searches for the application of law. The oriental judge creates it on the spot. The danger of a general arbitration provision is that the arbitrator will follow the example of the oriental judge. Its danger is a loose, personal and erratic application of the law. One of the great values of arbitration is the opportunity it presents for a prompt and intelligent determination of facts. Every commercial dispute involves both questions of fact and of law, but the law may be so simple that the arbitration may be really a determination of involved facts coupled with the simplest doctrine of law.

By temperament and training the engineer likes to "see the job finished." He favors, naturally, the arbitration act that arrives at a final decision promptly and saves time and money, just as the business man does. The conservative lawyer may very properly look with disfavor upon the New York type of law, while the more progressive attorney favors it. The engineer and the business man have both been too often the victim of the delays of the Courts and legal methods, and naturally are attracted to any suitable means of deciding a dispute promptly and directly. Many business and professional men will not lend their services as experts in Court trials on account of delays and unnecessarily unpleasant treatment to which they may be frequently submitted on the witness stand. They are particularly interested in the operation of such laws as those of New York and New Jersey, which require no appeal to the Court for legal interpretations, provide a simple process

readily understood by the parties to the contract, and relate to future as well as present disputes.

The owner's engineer is the usual and proper arbitrator of the various details of a construction contract, such as quantity, quality and classification of materials and workmanship. Some contracts make his decision final; others include an appeal to arbitration from his decision.

The clause relating to the finality of his decision may be so specific as to include the statement that his decision shall be "final" and that his decision shall be a "condition precedent" upon the payment of money or acceptance of the work by the owner. Or it may not be so specific, yet the contract as a whole implies clearly that the decision of the chief engineer shall be final and a condition precedent. In either case the Courts have upheld such provisions, except in cases of fraud or bad faith on the part of the engineer, or when he substituted his judgment for a clear contract provision, or read into a contract requirements not stated or clearly implied therein.

Some engineers believe that such a clause should form a part of all construction contracts, and consequently no arbitration clause should be included. When it is borne in mind that even in cases where the chief engineer has made a "gross error" but where no bad faith was evident the Courts have upheld the decision of the engineer, it is readily understood why many engineers and contractors deem it advisable not to make the decision of the engineer final but to permit an appeal beyond him to arbitration.

If the chief engineer's decision is not to be final, the usual alternative is to include an arbitration clause, as is done in Article 40 of the Standard Contract for Engineering Construction of the Joint Conference on Standard Construction Contracts. That clause provides for one or three arbitrators, unless otherwise provided by controlling statutes, and runs on at length relative to procedure and other details. It states that the decision of the arbitrators shall be binding and a condition precedent to any right of legal action.

In State Construction Contracts it is common to omit the arbitration clause and to make the engineer's decision final. This is probably due to the fact that a state department has no authority to bind the Commonwealth to an arbitration of any of its controversies unless so authorized by specific legislative act. Under this condition a controversy that cannot be settled by the chief engineer and the contractor can usually be adjusted by conference at which the commissioners, chief engineer and contractor are present.

Some authorities hold that such public agency would have the power to enter into arbitration agreement unless it is specifically limited or restricted by the law creating that agency. The American Arbitration Association holds the opinion that an arbitration clause contained in a state contract is enforceable under the New York Arbitration Law, despite the fact that the latter does not specifically authorize state or municipal agencies to enter into arbitration agreements.

Other legal authorities hold the opinion that the right of any officer or agent of the state to bind or tie the state contractually must have specific legislative sanction. Accordingly, unless state statutes authorize the arbitration of claims against the state, arbitration clauses in the state contracts would be useless and unenforceable against the state, and the passage by a state of an arbitration statute would not be considered to have thereby authorized the arbitration of claims against the state or the entering into agreement to arbitrate in the name of the state by its officers and agents. In the Pennsylvania Arbitration Law specific authority is given state and municipal bodies to enter into arbitration agreement.

In the recent contract for the Lake Champlain Bridge * of the Lake Champlain Bridge Commission the following clauses appear under the heading "Article C — Scope and Interpretation of Contract:"

The engineer shall in the first instance be the interpreter of the contract, and all the work contemplated and described therein shall be so done as to satisfy him that its intent is fulfilled. The engineer shall promptly render impartial decision on all claims of either party against the other and on all other matters governed by this intent, including questions as to the execution and progress of the work, the quality and fitness of materials and workmanship, the suitability of methods, and costs and values.

All such decisions of the engineer shall be final except as to the element of time and as to financial considerations involved, which, if no agreement in regard thereto is reached, shall be subject to arbitration as provided under Article P hereof.

Under "Article P — Settlement of Disputes" the clause reads as follows:

To minimize disputes and facilitate their prompt settlement, it is mutually agreed in Article C hereof that the engineer shall in the first instance be the interpreter of the contract.

All decisions of the engineer made in accordance with Article C hereof shall be final except as to the element of time and as to financial considerations involved, which, if no agreement in regard thereto is reached, shall be subject to arbitration under the published Arbitration Rules of the American Arbitration Association and pursuant to

* Fay, Spofford & Thorndike, Consulting Engineers.

the New York Arbitration Law, the parties hereby certifying and agreeing that they have read and are familiar with said rules and said law.

Even though there be no arbitration clause in your contract, this is no bar to arbitration because disputing parties may agree at any time to arbitrate existing disputes.

If the arbitration clause is written in the contract, then either party may start the arbitration, even though the other one does not care to arbitrate. If, however, both parties prefer to litigate instead of arbitrate, then all they have to do is for neither one to request arbitration, and then start their procedure at law.

The holding of a patent does not automatically start the machinery of the Courts; if the patentee wishes protection he can press the button and the machinery starts. Similarly, the inclusion of an effective arbitration clause in a contract starts nothing unless one of the parties to the contract presses the button. But in the patent case the legal machinery starts slowly and ponderously proceeds, stopping frequently at legal snags, whereas arbitration machinery is equipped with a faultless self-starter; it quickly gains acceleration, and high speed can be maintained to the finish.

When one reads the proposed Uniform Arbitration Act endorsed by the American Bar Association it is obvious, I think, that if it were adopted by all states there would be little or no use for engineers as arbitrators under such an act because of the necessity of legal knowledge to interpret and administer it. Under the Massachusetts act, engineers would be well equipped to serve as the sole arbitrator in cases involving both construction facts and law, if an attorney were the third arbitrator. Under the American Arbitration Association Act, or the New York act, the engineer or architect is the logical choice as an arbitrator on construction contract disputes. For this reason the rest of this paper refers *only to an arbitration under a statute like the New York State act* (or the American Arbitration Act); it is that type of arbitration in which an engineer would be most likely to be appointed as arbitrator.

In the Appendix at the end of this paper four arbitration acts, two typical state laws and two draft acts, are inserted, — the New York act, the Massachusetts act, the Uniform Arbitration Act endorsed by the American Bar Association, and the Draft State Arbitration Act endorsed by the American Arbitration Association.

The New York Arbitration Act is an example of a workable law that fills a real need, though not suited to disputes inherently involving intricate legal problems.

The Massachusetts act is a distinct step ahead of the old common-law doctrine. It includes future disputes and provides recourse to the Courts on matters of law.

The Draft State Arbitration Act endorsed by the American Arbitration Association is intended as an improvement upon the New York act.

The Uniform Arbitration Act endorsed by the American Bar Association is the mildest departure from the common-law doctrine. It relates only to existing disputes.

For the benefit of those who may be unfamiliar with the details of procedure in arbitrations, the writer has chosen for simplicity to discuss procedure under one type of arbitration law only. The following remarks are gleaned from his own experience and from that of others and may be helpful to the engineer upon whom falls for the first time the duty of serving as an arbitrator.

REMARKS ON PROCEDURE UNDER THE NEW YORK TYPE OF ACT

Under such an act as that of New York the arbitrator reports his findings to the parties, and if the losing party fails to act on the award then the Court will make the arbitration findings the judgment of the Court, just as though it had been tried by the Court itself, and, by the same token, this Court will require an arbitration to proceed and will stay any suit or proceeding upon being satisfied that the issue involved is one which was referable to arbitration. Its irrevocable features make it impossible for either of the parties to the contract to revoke the arbitration feature of the contract except on any such grounds as exist in law for the revocation of any contract.

Of course an arbitration clause included in a contract can only refer to such disputes as arise within the scope of that contract of which it forms a part.

Such a clause obviously refers to the settlement of some future dispute, and is plainly intended to protect the parties to the contract against litigation or delayed settlement if a dispute subsequently arises.

In an arbitration both sides are heard speedily. Many Courts are months and even years behind on their calendar. When an arbitrator has been chosen, a Court with judge and jury have been thereby created to hear the case as soon as the parties are ready to proceed. The hearings, including the time required by the arbitrator for filing his award, may not

exceed a few days or weeks, whereas if the same dispute is litigated in the Courts it may easily be dragged into years. It should be borne in mind, however, that an arbitration can be delayed, but if this is done it should occur only in consequence of a mutual agreement of the parties or of the counsel representing the parties. The arbitrator should require the hearings to proceed if one of the parties objects to any delay and if there is no valid reason for delay.

What the cost of an arbitration will be depends largely upon the amount of evidence and the amount of delays in presenting the evidence. The principals can closely predetermine the cost if they desire to do so. On the other hand, hearings may be dragged out unnecessarily long and involve greater expense than is reasonable, particularly where attorneys who are unfamiliar with the subject represent the parties.

The advantages of an enforceable arbitration clause covering future disputes in a contract are many. The very fact that, if a dispute arises, the issue will be judged by an expert who is presumed to have superior knowledge of the subject-matter of the controversy, will tend to prevent disputes from arising. It tends to reduce the number of disputes founded on ill-faith, which might stand a chance with a jury, or which might, through legal technicalities, become the cause of much delay in Court, causing the holding up of payments, with consequential financial embarrassment, which might force one of the parties to accept an unjust settlement. The fact that an arbitration clause possessing effectiveness forms a part of a contract is not only a protection against litigation but it also predisposes the parties to mutual settlement of any controversy which may arise without even recourse to arbitration. But when there cannot be a meeting of minds sufficient to settle the controversy, the Arbitration Law throws the whole matter into the hands of some one who it is assumed will be familiar with the subject-matter, will bring to bear an objective view upon the controversy, will be impartial, and will make an award promptly.

Furthermore, an arbitration once started need not proceed to a decision any more than an action in Court must necessarily proceed to a decision. The controversy may be settled by mutual agreement at any time during the process of hearings.

Again, in certain cases it has seemed to the writer appropriate for the arbitrator to attempt to get the parties to the controversy to agree between themselves as the hearings have proceeded, rather than let the matter go to final decision. This is sometimes possible, especially in cases where the facts presented by one side are in the nature of "surprise evidence," not previously known to the other party. The arbitrator

should by no means act as a mediator at this time, for arbitration is not mediation. In certain instances, however, it is not inappropriate for an arbitrator *after* having heard all of the evidence which the parties desire to present, and *before* he has heard the arguments of counsel or briefs have been filed, to intimate informally to counsel and clients about how the matter tentatively rests in his mind, assuring them, however, that his mind is still open. This furnishes them with rather definite grounds upon which to come to an agreement "out of Court." If this can be accomplished it has the advantage that there is no decision rendered against either party.

If, however, this does not accomplish settlement, then the arbitrator should proceed to hear arguments, study briefs submitted, as well as all evidence that has been submitted, and render his decision in writing.

In many instances, of course, such a tentative indication of how the matter rests in the arbitrator's mind cannot or should not be given until rendered as a finding. In no event should such an intimation be made until all evidence has been presented, and even then only in a tentative and general manner.

If a settlement is consummated between the parties as a result of the above it may be well for them to enter into a formal stipulation setting forth the terms of settlement so that the arbitrator can render an award on such settlement, attaching and referring to the stipulation. The value of this method lies in the fact that if either party later refuses to abide by the settlement it will not be necessary to arbitrate the matter all over again. Another method is simply a notice to the arbitrator, signed by the parties, to the effect that the parties have consented that the arbitration and all proceedings thereunder be discontinued, as they have amicably adjusted their differences.

In almost all cases when final decision has been rendered, the parties to the controversy perform the terms of the award without necessitating recourse to any legal enforcement, but under most state arbitration laws the award of the arbitrator is enforceable in the same manner as a judgment in Court in civil action. If such enforcement is necessary, however, the provisions of the statute should be carefully followed, and confirmation obtained by the proper Court. Motion for such confirmation should be made within the time specified in the statute.

Juries in their ignorance of technical and business affairs are more apt to render a compromise verdict than are arbitrators who are thoroughly acquainted with the subject in controversy. Juries are often seemingly influenced by the respective financial abilities of the parties, and by the hardship their verdicts may cause. An arbitrator must

guard against this error. He must not give these matters of hardship any weight, for his province is to arrive at justice based on evidence.

The arbitrator has to decide questions of law and fact. He is not bound by technical rules of evidence or principles of law. Obviously he should bear in mind that his responsibility is as great as that of a judge sitting in a court of law at a jury-waived session. He, of course, will be guided by the highest principles of justice and rules of personal conduct. To this end he obviously must be impartial, which it will be difficult for him to be if he has any personal, financial or family relations with either of the parties, has any interest in the outcome of the controversy, has entered into any private agreement with either of the parties respective to the subject-matter in controversy, or possesses any prejudice or bias in favor of or against either of the parties. Failure of the arbitrator to disclose any interest or bias he may have might cause the Court to set aside his award or refuse to enter judgment.

Should either of the parties challenge an arbitrator on any of the above grounds, he should obviously refuse to serve as such. Should he, however, have such interest which he deems might lead either party to fear that he might become biased, he should, before accepting the appointment as arbitrator, state the facts and should not serve unless both parties designate in writing that they still want him to serve, in spite of the facts he has presented.

An illustration of this is the following: An engineer is approached and requested to act as sole arbitrator in a controversy between A and B. He had served A as consulting engineer ten years previously on a subject-matter other than that in controversy. His services had been concluded and he had been paid in full. The engineer thus approached should state this fact in writing to party B, with a copy of his letter to A. He should ask party B if, under the circumstances, he desires to have him serve as arbitrator. Party B replies that he is wholly satisfied with the arbitrator, considers that it makes no difference, and agrees again that he desires to have him sit as arbitrator. This should close the correspondence, and it is proper under these circumstances for the engineer to serve.

An engineer, however, may go further than this and may desire to have stipulated on the records at the beginning of the arbitration the fact that he had at a certain time served party A; that the employment has been terminated because the work has been completed and he has been paid in full; that he notified B to this effect and that B, fully aware of this fact, still desires to have him sit as arbitrator. This course is strongly recommended.

Disputants may mutually agree upon an individual as the sole arbi-

trator or upon three arbitrators; or they may agree to each select one arbitrator, who in turn shall select a third. In the latter case the third arbitrator is one upon whom the two previously selected arbitrators agree, without reference to the desires of the parties to the controversy.

In some arbitrations it is clear that questions of law must be decided as well as those of fact, and under such circumstances an attorney who has had business experience is peculiarly fitted to preside. In a three-man arbitration on a construction contract or on any question in which legal questions are involved, two engineers, or an engineer and a contractor, and a retired judge may be an ideal tribunal.

It is too often assumed that the third arbitrator stands in the place of an umpire, which is not the intent of the arbitration law. The third arbitrator should certainly participate fully in the arbitration from the beginning. No arbitrator can delegate his duties or authority to the others. Each one is personally responsible and is obligated to perform fully the duties of his office.

Three-man arbitration is preferred by some parties. They doubtless feel that the man they choose is their agent or advocate on the tribunal. This, however, should never be assumed by an arbitrator. He should listen to all the evidence and weigh it with a judicial and open mind, just as he would do if acting as the sole arbitrator. After coming to his own conclusions, however, if they are at variance with those of his associate arbitrators, it is appropriate then for him to defend or advocate his own views in conference with his associates. Only to that extent should he in any way be partial in his actions.

An arbitration is not a conciliation. The arbitrator's duty is not to seek a compromise. Conciliation and compromises have failed before arbitration was resorted to. The arbitrator's duty is not to argue or defend any part of the case, but to hear and to decide solely on the evidence submitted to him. He is obligated to seek a fair decision and to make a just award. Some might go so far as to claim that he should not even argue or defend his decision. Isn't this going a bit too far, however, in a case where he is one of three arbitrators and cannot agree with the other two? It appears, then, that it is his duty to try to convince his associates that his honest conviction should be adopted by them; it is equally his duty to give careful consideration to the arguments of his associates and endeavor to adopt their conclusions if he honestly can.

An engineer who is chosen by one party to act as one of three arbitrators is not in so enviable a position as he who is chosen as the third arbitrator by the other two arbitrators, or as one who has been selected

by the parties jointly as a sole arbitrator. It has been the writer's experience to have served in both capacities, and he unhesitatingly states that his position as a single arbitrator, or as the third of three arbitrators, is to be desired rather than the position of an arbitrator chosen by one party. One may hold the clearest view of his duty and be actuated only by the highest motives, yet when the arbitrator chosen by the opposing side of a controversy does not so act, but assumes the rôle of an advocate, the position of the former is certainly awkward. Is it his duty, then, to assume a similar rôle in order that substantial justice may be reached? If so, this puts the third arbitrator squarely in the place of an umpire. Or should the first arbitrator remain silent, permitting the second arbitrator to "try" his side of the case, hoping that by so doing the third arbitrator will notice the marked difference in behavior and will guard his mind against the influence of his aggressive associate?

In most cases a sole arbitrator is greatly to be preferred over a three-man tribunal, and it is always easier to make an appointment with one busy man than it is to get three of them to agree upon the same hour.

Again, a tribunal composed of three men is obviously more expensive than one with a sole arbitrator, but cases will occur where the deliberation and judgment of three men have an advantage.

The arbitrator's attitude toward the problem will obviously be influenced by his possession of a proper and an accurate appreciation of just what an arbitration means. Arbitration is not in competition with the Courts; it is intended to relieve the Courts of those controversies which have no proper place there. It is not at variance with the law; it is a very practical adjunct of the law. It is a formal proceeding which many of the states prescribe by law. It is in no sense a mediation. Mediation is often an informal proceeding regulated by the views of the parties or the mediator. A mediator may voluntarily proffer his services or he may act on invitation. An arbitrator is always invited and selected by the parties. In mediation the proceedings may take the form of individual conference, first between the mediator and each party separately, and then a joint conference, whereas all arbitration hearings must be conducted with both parties present. The result of mediation is often the result of bargaining and usually terminates in a compromise in which the best trader wins. Furthermore, the conclusions reached in mediation are not enforceable in Courts. The conclusion of an arbitration, on the other hand, is the result of considered evidence and the application of justice, and is enforceable under arbitration acts.

Conciliation seeks especially a state of mind which may lead to a

direct settlement or to mediation, and is often instrumental in the settling of a dispute irrespective of its merits. Conciliation and mediation may precede, but never come after, arbitration.

Every arbitrator should keep constantly before his mind the fact that his award is solely *an adjudication of the respective rights of the parties*.

The Submission. — The Submission is a document in which parties to a contract specifically state in writing the matter that is in controversy and the questions which it desires to have determined by the arbitrator. It should be signed by both parties and acknowledged; and wherever possible should give the name of the arbitrator, or arbitrators. It is not absolutely necessary to prepare a submission, although it is usually executed in order to define more precisely the matters in dispute and the limits of the powers of the arbitrator.

A submission to arbitrate is a special agreement concerning the particular question or questions in issue. The submission is usually entered into in addition to the general agreement to arbitrate. It defines precisely the questions in dispute. No room should be left for doubt as to its meaning or scope.

The submission should specify exactly the conditions under which the arbitration shall be conducted. For example, it may state the county or counties in which the hearing shall be held; and also may state a certain time limit within which the award shall be made. This submission therefore gives form, substance and character to the arbitration.

The necessity for stating in the submission so precisely the matter or matters at issue is for the purpose of eliminating or reducing to a minimum the possibility of an award being later set aside because it is not in conformity with the questions submitted. It is obvious, then, that both parties must agree on the questions submitted, and in the absence of such an agreement the Court under the act will order an arbitration.

The Arbitration. — At the start the arbitrator should read and study the submission with the greatest care. His powers, duties and authorities are derived from and limited by the submission. He should know its contents almost by heart, for he must observe all of the conditions and stipulations set forth therein. He must decide all of the points in issue and must not consider any issue not specified therein.

He should be familiar with the conditions and rules referred to in the submission and should see that they are followed throughout the whole proceedings, and are faithfully observed by both parties of the controversy as well as by himself. He should, at the outset, provide himself with a full text of the State Arbitration Law and follow it to the letter, so that his arbitration and his findings may be counted a legal process as the

State Arbitration Law has anticipated. These are his duties *before* the hearings.

After being chosen and confirmed by both parties, he should set a time and place for the first hearing. On that day he will ascertain the names of the persons appearing in behalf of each party; take his oath as arbitrator, or, if it has already been taken, he will submit it for the stenographic records.

The arbitrator's fee may or may not be fixed and stated in the submission. It usually is not. The fee is usually agreed upon in conference between the parties and the arbitrator on a *per diem* basis. Sometimes the agreement is to the effect that each party shall pay one-half of the arbitrator's fee and expenses; in other cases it is left to the arbitrator to award the amount each party shall pay. When an agreement has been reached upon this matter, it is well to set forth this agreement accurately by a stipulation dictated for the records at the start of the arbitration, or by the exchange of correspondence between the arbitrator and the parties to the controversy.

The arbitrator should read the submission and ascertain whether the parties are in complete agreement on the question or questions which he is to decide. Then this submission should be marked by the stenographer or clerk of the arbitration and made a part of the record as an exhibit. Provided any amendment to the submission is desired, the consent of the parties should be obtained. Either an amended submission should then be presented or the existing submission revised, and the changes stipulated on the record.

While the submission should be so carefully worded that it admits of only one interpretation, still there will be cases where the parties will not agree on the meaning of certain language in the submission. In such an instance the arbitrator should use all his powers to have the parties agree, and if successful should cover the matter by stipulation on the records. Failing in this he should require the parties to state their respective interpretations on the record, and then proceed with the hearing, reserving to himself the final interpretation of the questionable language. As the hearings proceed the reasonable interpretation of the language in question may grow clearer, and at the close of the hearings, if both parties cannot agree upon it, they may both agree to leave its interpretation to the arbitrator. If they do not so stipulate, the arbitrator must interpret the language in question himself, and make his award in harmony with the decision he adopts. One arbitrator would consider this an end of the matter. Another might go a step further and state his interpretation of the questionable language in his findings after

first stating the interpretation claimed by each party. This would properly introduce the matter to the Court if an appeal is made on the ground that the arbitration did not follow the submission, which is one of the few bases for appeal permitted in the New York type of statute.

During the hearings he should maintain a composure free from animosity or partiality. He should allow the parties and their witnesses to make their own statements in their own way without frequent interruptions, and should avoid conducting the hearings in such a way as to prejudice or indicate any prejudice toward the interest of either party. He should not receive private communications from either party without acquainting the other of their contents, for each party should be accorded an absolutely equal opportunity to present his case.

Certain state laws require that the witnesses be sworn before testifying. The writer feels that even in states where it is not required it is most advisable. The arbitrator administers the following oath by rising and causing the witness to raise his right hand:

"Do you solemnly swear that in the causes now in hearing between A and B, you will tell the truth, the whole truth, and nothing but the truth, so help you God?"

The witness should answer "Yes" or "I do." The record should show that the witness was sworn by the arbitrator before testifying.

The receipt of evidence should take the following form:

First, the arbitrator hears the complainant's witnesses and permits the defendant to cross-examine the complainant's witnesses. He then hears the defendant's witnesses and permits the complainant to cross-examine the defendant's witnesses. The arbitrator may also examine the witnesses if he so desires, but in general it is not advisable to interrupt witnesses while being examined by attorneys. Consequently the arbitrator's inquiries should, as a general rule, come at the close of the witnesses' evidence. It is, however, wholly appropriate and advisable for the arbitrator to interrupt a witness if, in his judgment, he deems it necessary, so that the record of his testimony shall be understood when it is in print. For example, if the witness in referring to a part of a plan speaks of "this" place and "that" place, it is proper and desirable that the arbitrator should say: "The witness when he referred to 'this place' pointed to station 60 plus 75 on the plan, Complainant's Exhibit No. 7, and when he pointed to the place he called 'that place' he pointed to the front elevation of buttress 43 of the main dam." After an arbitrator has done this two or three times, the witness will probably adopt proper words, so that his testimony will thereafter need no correction for the

record. Each party should also be permitted to introduce testimony in rebuttal, which should also, of course, be subject to cross-examination by the other party.

In cases involving many items and considerable detail, the reference to plans, accounts, vouchers and other records, a stenographic report is almost indispensable. In such cases, at the beginning of the hearings, the arbitrator administers an oath to the stenographer to faithfully perform his duties. A notation of this should also appear on the record. However, in matters involving but little detail, and in those disputes which are confined to only a few items, a stenographer may not be required. In such cases the arbitrator will keep the necessary notes to aid him in marshalling his facts at the close of the hearings. This method slows up the process of taking evidence, and is sometimes a considerable burden on the arbitrator. Whenever possible, with the consent of the parties, a stenographic record should be made.

The evidence presented in simple cases where no stenographic record is to be made may be given informally and in the form of a conference, both parties, of course, being present, and presenting for the consideration of the arbitrator such evidence as they desire, the arbitrator in turn questioning them at will. Wherever the parties agreeing to arbitrate specifically prohibit the presence of lawyers in their agreement, such attorneys should not be permitted to appear or take part at the hearings. In the absence of such an agreement attorneys representing the parties may appear and take part similarly as in Court proceedings.

Hearings are not public unless so authorized by the parties. Only those persons authorized by the parties or required by the arbitrator may be present at the hearings. Both written and oral evidence may be presented, and exhibits, such as letters, plans, estimate books, accounts, materials, may be introduced after being marked for identification; *i.e.* "Complainant's Exhibit No. 1;" "Defendant's Exhibit No. 12."

Arbitrators are authorized by the statute to require any person to attend before them as a witness, and they may issue subpoenas for this purpose as well as to compel the production of evidence. If any person refuses to comply with such subpoena, he may be punished for contempt by the proper Court.

Obviously there is certain evidence which an arbitrator may hear which is not permissible in a court of law. A simple illustration of this is "hearsay evidence." As a general rule, in a court of law a person is not permitted to testify to the statement made by another person who is not to be a witness. This is called "hearsay evidence." An arbitrator may

be requested by one of the parties to refuse to hear certain hearsay evidence which the other party may desire to present. The arbitrator may decide whether or not he will hear it, and his determination is final.

The writer's view of this matter is that he should admit hearsay evidence whenever either party desires to present it. In fact, any evidence of any character which pertains to the subject-matter of the controversy, even remotely, should not be excluded in an arbitration if either party wishes to have it presented. An arbitrator can properly assume that if he is chosen for this important function, both parties and their attorneys must have confidence in his ability and judgment. When the parties agreed to the arbitration they voluntarily gave up certain legal rights, and one of them was to be allowed to limit by rules of law the evidence presented. They voluntarily left this whole matter to the arbitrator. They must now rely upon his determination of the competency and the weight of any evidence he chooses to hear. He is both judge and jury.

The weight of some evidence which is offered may seem negligible. The receipt of it may turn out to be wholly a waste of time for all parties. It may turn out to be incompetent or irrelevant. On the other hand, although at first appearing to have no weight, it may later develop to be of considerable value when coupled with other well-established facts. One arbitrator considers this a matter about which he will use his best judgment in each instance. Another arbitrator holds the view that if he has heard everything that either party desires to present, and has excluded nothing, he can appropriately state in his award that he has heard all of the evidence that either party desired to present, and that upon consideration of the evidence he has reached the following conclusion. Then follows his conclusion, which is merely a statement of the award and which may contain no reasons and no arguments. There is, then, nothing in his award that indicates whether or not he has given any weight to evidence to which objection has been raised.

While an arbitrator may adopt as a general policy the principle to admit all evidence either party desires to present, he must at the same time keep clearly before his mind the fact that he is *adjudicating* and not *adjusting* a controversy. For example, he may hear evidence which he may consider incompetent. Here is an illustration of a situation which not infrequently arises in construction contract arbitrations. The owner and the contractor have submitted certain disputes to arbitration. These same disputes have already been the subject of many conferences between the parties, and at these conferences the owner may have agreed to settle all of the controversies for a lump sum of, say, \$20,000. The

contractor, on the other hand, has made a compromise offer to settle all differences for \$25,000. The amount of the claims now presented for arbitration aggregates \$60,000. It may be next to impossible to exclude the evidence that the owner offered \$20,000 in settlement of these claims, and that the contractor was willing to accept \$25,000. The arbitrator, however, should in general give no weight to evidence of this character. These offers were made under conditions when the parties were making a final but futile effort to mutually settle their controversy. The agreements were made for the purpose of avoiding an arbitration. At the time when the offers were made the owner and the contractor, either or both, may have been financially embarrassed. This may have affected the compromise they made. Offers of compromise are certainly not competent evidence in an arbitration. Obviously, counsel for the owner will argue that the contractor never expected to receive a greater award than \$25,000; otherwise he never would have made such a counter-offer. Counsel for the contractor will argue that the owner has already agreed that he owes the contractor at least \$20,000. Neither of these arguments should carry any weight with the arbitrator. In settlements "across the table" it is not uncommon for one or the other of the parties to accept an unjust settlement for the sake of being free of the trouble. Now that they have come to arbitration they are both entitled to all of their rights; they seek an award based on justice. A just award may work a hardship, and an award that aims to avoid a hardship may be lamentably unjust. The parties knew that, or should have known it, before they abandoned their attempts at compromise and entered upon arbitration.

Some arbitrators would exclude evidence of this sort. The writer is inclined to allow such evidence and to let either side present and argue it in any way it may choose; but in general it carries no weight.

While the futile *result* of a compromise may be incompetent evidence, certain facts which may have been used during a conference for the purpose of mutually settling a difference may be competent. Among the claims submitted to the arbitrator is Claim No. 14 for \$2,500. A six-months' old letter is brought forward in which the contractor stated to the owner that on Claim No. 14 he is entitled to \$1,000. The letter should be received in evidence and also the explanation on the part of the contractor that he made an arithmetical error in arriving at the \$1,000 amount, together with an explanation of just what the error was and exhibit of his estimate book showing the error therein.

A case may arise when counsel insist upon a ruling on the meaning of a clause in the submission, or on some matter of law, while the hearing

is in progress and before final decision. There is nothing in the law which requires that the arbitrator shall make any such preliminary ruling. It is left to his sole discretion and judgment whether or not he will make such a ruling. It is properly recognized that often he is not an attorney, and because of that fact the writer is inclined to believe that he should refrain from making such rulings unless some exigency makes it seem very necessary. If rulings of law are really necessary the submission may be amended by agreement of the parties and the arbitrator, so as to provide that the arbitrator obtain the ruling of the Court on a certain matter of law before proceeding farther with the arbitration.

By such practice the arbitrator does not run the risk of making any ruling that would appear to be so unjust, biased or unauthorized as to form a basis for setting aside his award.

Some of the details of the arbitrator's work are to set the time and place of the hearing; to see that the parties and stenographer are properly notified; to ascertain whether the witnesses will appear voluntarily and bring the necessary records; or whether a subpoena will be required. In the latter case the arbitrator should use the referee form of subpoena for witnesses and the *duces tecum* form for records. When hearings are incomplete it is his duty to adjourn them from time to time for further evidence, but he should avoid all possible unnecessary delays.

At the close of the final hearing he should ask if either of the parties has any further evidence to present. If there is no evidence offered he should then permit the parties to sum up their case by argument or by written brief if they so desire. He may or may not wish to hear oral argument. He takes then a final adjournment, promptly arrives at his decision, and sends it to each party in writing.

It is within the arbitrator's power and discretion to reopen the hearings at the request of either party for reasons which he deems sufficient in the promotion of justice and equity.

Throughout the case the arbitrator must guard against the occurrence of any of those things which might constitute cause for modifying or vacating his award: namely, corruption on the part of the arbitrator, acts of bias, exceeding of authority, refusal to postpone or to adjourn any hearing for sufficient cause, refusal to hear evidence which is pertinent and material to the controversy, misconduct or misbehavior which prejudices the rights of the parties, and imperfect execution by the arbitrators of their powers "to make a mutual, final and definite award."

It is therefore advisable, before executing any award, to examine the award carefully in the light of the above suggestions so as to be sure that it will be valid and binding.

The Award. — The decision of the arbitrator must be in writing and made within the time limit set in the submission or the extensions thereof mutually agreed upon. After the arbitrator has judicially considered his case, he will write his findings and award. He shall take into consideration all competent evidence submitted during the hearings. If he has visited the site of a structure, it should be so stipulated on the record, preferably immediately after he has taken such a view. It should be stated that he did so at the request of both parties. He may take into consideration anything he saw on that view. The award should be based upon all competent evidence which is received and which is reviewed in the light of reason.

After the findings and the award have been signed and acknowledged before a notary public, original copies are sent to the parties, to be used in case the award is to be entered in the Court. Under the present state arbitration laws it has been found that the award will be performed without the formality of having a judgment entered in most cases. If it is necessary to confirm the award, this must be done by the party in whose favor the award has been made within a time limit (one year in New York) from the date of the award.

There can be but one award. It is the award of the single arbitrator, or a majority of the three, unless the submission specifies to the contrary. By making the award the arbitrator terminates his authority under the submission. His award, therefore, should never contemplate further hearings on the subject-matter. It should not be conditional upon any future act. It should be positive and admitting no alternative way of performance. It should not reserve any powers in the future to the arbitrator.

The award *must be in accordance with the submission* as required by law. It must not go beyond the terms of the submission or decide any matter whatever not within the submission. It should be a complete adjudication of every matter submitted, and it should observe each and every condition set forth in the submission, including the time limit, if any was specified therein.

An award should be so simple and certain in its language as to permit of only one interpretation, and that the right one. It should be so phrased as to be possible of performance at the time the award is made, and should be explicit concerning the terms of such award and the amounts awarded. An illustration is as follows: An arbitrator finds that —

Item 1. — Extra concrete in westerly wing wall, owner A shall pay forthwith to contractor B, \$1,647.37.

Item 2. — Reinforcing steel in foundation of gate timber, owner A shall pay forthwith to contractor B, \$874.63.

Item 3.—Owner A shall pay forthwith to contractor B interest at the rate of 6 per cent per annum on Item 1 for the period from May 16, 1928, to date of this award, namely, \$53.53; and owner A shall pay to contractor B interest at the rate of 6 per cent per annum on Item 2 from August 15, 1928, to date, namely, \$13.32; or a total of \$66.85 shall be paid forthwith by owner A to contractor B.

The arbitrator is not required to state his reasons for his decisions, but he may do so if he sees fit. It is believed by the writer that the omission of reasons and discussions as to the evidence is the better policy.

The arbitrator's duty ends when the award is put in writing, signed and acknowledged before a notary public or other duly authorized officer and delivered to the parties or to their counsel.

CONCLUDING GENERAL OBSERVATIONS

Commercial arbitration acts by no means are confined in their application to construction work alone. They are intended to aid also the merchant, banker, shipper and business man.

The growing practice of arbitration appears to be as much a benefit to the lawyer as to his client. The spirit of enterprising modern business is co-operative. It tends toward mass production, amalgamation of individual plants and nation-wide distribution, which so geographically distributes its business influence as to make the settlement of disputes by litigation extremely cumbersome. This tends to influence the attorney to advise arbitration for his client after conciliations and attempts to compromise have failed. This, however, he is unable to do when the arbitration is built on so flimsy a contractual structure as is the situation in those states having no effective arbitration law.

The attorney has often been the one who has devised the forms of business corporations. He has had a more powerful hand in their administration in recent years than formerly. In fact, he frequently directs large corporations. This has doubtless brought to his attention the tremendous cost, loss of time and loss of valuable commercial friendships which litigation has caused, and has brought him to understand more clearly the vital importance of prompt, amicable settlement of difficulties, with a consequent release of capital for employment in the business.

An attorney who has had business training is peculiarly fitted to act as an arbitrator in business disputes. This same type of attorney is also especially qualified to act as counsel at arbitrations.

The remarks of Elihu Root and Mr. Justice Harlan F. Stone indicate the attitude of the legal profession toward arbitrations in general.

Before the American Bar Association in Washington, in 1914, Elihu Root said in part as follows:

The law is made not for lawyers but for their clients, and it ought to be administered so far as possible along the lines of laymen's understanding and mental processes. The best practice comes the nearest to what happens when two men agree to take a neighbor's decision in a dispute and go to him and tell him their stories and accept his judgment. Of course all practice cannot be as simple as that, but that is the standard to which we ought to try to conform rather than the method of acute, subtle, logical, final, discriminating highly trained minds. It is that sort of thing which merchants seek when they try to get up committees of arbitration to decide their controversies without the intervention of lawyers. They are trying to get their questions settled in accordance with their instincts and habits of thought.

Mr. Justice Harlan F. Stone in the Academy of Political Science Proceedings, in July, 1923, in an article entitled "Scope and Limitations of Commercial Arbitration," said in part:

On the other hand, the very refinements and complexities of our court machinery, which make it a more or less effective instrument for administering justice in the difficult or complicated case, often make it cumbersome and dilatory when applied to controversies involving simple issues of fact or law. This is especially the case when the issue of fact turns upon expert knowledge as to the nature or quality of merchandise or the damage consequent upon the failure to perform a contract for its delivery. There are, of course, numerous other examples of cases in which the real issue is one which can be better determined by a layman having training and experience in a particular trade or business than by judge and jury who have not had that training and experience.

The American Arbitration Association aims to establish arbitration tribunals throughout the United States at all important commercial centers, which shall be immediately accessible to business men. It has formed a national panel of arbitrators numbering several thousand business men and lawyers, representing all lines of industry. To these men may be submitted questions of arbitration.

The American Arbitration Association recommends the following wording for an arbitration clause:

Any controversy or claim arising out of or relating to this contract, or for the breach thereof, shall be settled by arbitration under the Rules of the American Arbitration Association, and judgment may be entered on the award in any court having jurisdiction.

Reference to the Rules makes it unnecessary to describe the detailed procedure such as is contained in the example form of submission, page 192. The American Arbitration Association believes it is sound theory to have the clause or the submission contain merely the agreement to

arbitrate and a brief statement of the specific matter to be arbitrated, and leave all the procedural requirements to be found in the Rules which will govern the arbitration, as illustrated by sample of American Arbitration Association Submission Agreement, on page 195.

This association has prepared a book entitled "Suggestions for the Practice of Commercial Arbitration in the United States" in which will be found many hints to the practice of arbitration both for the parties and for the arbitrator. In addition, it contains a summary of the different State Arbitration Laws.

The marked increase in arbitration indicates that it is appealing to a wider range of business organizations. There is a profound interest in the subject. Only a small beginning has been made thus far, due to a considerable extent to the fact that a great many industries are unfamiliar with the methods and the benefits of arbitration.

The Bar Associations throughout the country take the attitude of encouraging the settlement of disputes out of Court by arbitration, as far as practicable. The engineering profession concurs in this attitude. A mighty burden will be taken from our already overloaded Courts when business men in general invoke this method of adjusting their differences.

The engineer is peculiarly adapted for the position of arbitrator in controversies arising out of construction contracts because he is versed in the technicalities and terminology of the industry. He is by temperament and training fitted to hear disputes and render judgments impartially. From the beginning to the end of the execution of many construction contracts he has had to stand in the position of a judge of the suitability and sufficiency of materials and workmanship as required by all construction contracts.

By training and experience he should be possessed of reserve and resources, should be a searcher for the facts, as well as an accurate recorder of and an analyst of them. He is, generally speaking, a fair-minded fellow possessing a sound sense of justice which ought not to be opposed to fundamental legal rules, for fundamental rules of law which control civilization are those which society has been willing to adopt after years of experience, and are consequently essentially just.

While it has become a precedent in the Boston Society of Civil Engineers to refrain from discussing the address of its retiring President, the writer hopes that, because of the nature of the subject he has chosen, and because of its highly controversial character, his paper will be fully and freely discussed.

Appendix

THE NEW YORK ARBITRATION ACT

Chapter 275, Laws of 1920, in effect April 19, 1920

ARTICLE 1

SHORT TITLE

SECTION 1. *Short Title.* This chapter shall be known as the "Arbitration Law."

ARTICLE 2

GENERAL PROVISIONS

SECTION 2. *Validity of arbitration agreements.* A provision in a written contract to settle by arbitration a controversy thereafter arising between the parties to the contract, or a submission hereafter entered into of an existing controversy to arbitration pursuant to title 8 of chapter 17 of the code of civil procedure, or article 83 (now 84) of the Civil Practice Act, shall be valid, enforceable and irrevocable, save upon such grounds as exist at law or in equity for the revocation of any contract.

SECTION 3. *Remedy in case of default.* A party aggrieved by the failure, neglect or refusal of another to perform under a contract or submission providing for arbitration, described in section two hereof, may petition the supreme court, or a judge thereof, for an order directing that such arbitration proceed in the manner provided for in such contract or submission. Eight days' notice in writing of such application shall be served upon the party in default. Service thereof shall be made in the manner provided by law for personal service of a summons. The court, or a judge thereof, shall hear the parties, and upon being satisfied that the making of the contract or submission or the failure to comply therewith is not in issue, the court, or the judge thereof, hearing such application, shall make an order directing the parties to proceed to arbitration in accordance with the terms of the contract or submission. If the making of the contract or submission or the default be in issue, the court, or the judge thereof, shall proceed summarily to the trial thereof. If no jury trial be demanded by either party, the court, or the judge thereof, shall hear and determine such issue. Where such an issue is raised, any party may, on or before the return day of the notice of application, demand a jury trial of such issue, and if such demand be made, the court, or the judge thereof, shall make an order referring the issue or issues to a jury in the manner provided by law for referring to a jury issues in an equity action. If the jury find that no written contract providing for arbitration was made or submission entered into, as the case may be, or that there is no default, the proceeding shall be dismissed. If the jury find that a written contract providing for arbitration was made or submission was entered into and there is a default in the performance thereof, the court, or the judge thereof,

shall make an order summarily directing the parties to the contract or submission to proceed with the arbitration in accordance with the terms thereof.

SECTION 4. *Provision in case of failure to name arbitrator or umpire.* If, in the contract for arbitration or in the submission, described in section 2, provision be made for a method of naming or appointing an arbitrator or arbitrators or an umpire, such method shall be followed; but if no method be provided therein, or if a method be provided and any party thereto shall fail to avail himself of such method, or for any other reason there shall be a lapse in the naming of an arbitrator or arbitrators or umpire, or in filling a vacancy, then, upon application by either party to the controversy, the supreme court, or a judge thereof, shall designate and appoint an arbitrator or arbitrators or umpire, as the case may require, who shall act under the said contract or submission with the same force and effect as if he or they had been specifically named therein; and unless otherwise provided, the arbitration shall be by a single arbitrator.

SECTION 4-a. *Enforceability of award in certain cases.* Where pursuant to a provision in a written contract to settle by arbitration a controversy thereafter arising between the parties to the contract, or a submission described in section two hereof, an award has been, or is hereafter rendered, without previous application to the supreme court, or a judge thereof, as required by section three hereof, such award shall notwithstanding anything contained in section three hereof be valid and enforceable according to its terms, subject, nevertheless to the provisions of this section. At any time before a final judgment shall have been given in proceedings to enforce any such award whether in the courts of the State of New York, or elsewhere, any party to the arbitration who has not participated therein may apply to the supreme court, or a judge thereof, to have all or any of the issues hereinafter mentioned determined, and if, upon any such application the court, or a judge thereof, or a jury, if one be demanded, shall determine that no written contract providing for arbitration was made, or submission entered into, as the case may be, or that such party was not in default by failing to comply with the terms thereof, or that the arbitrator, arbitrators and, or umpire was, or were not appointed or did not act, pursuant to the written contract, then and in any such case, the award shall thereupon become invalid and unenforceable. Where any such application is made any party may demand a jury trial of all or any of such issues, and if such a demand be made, the court or a judge thereof shall make an order referring the issue or issues to a jury in the manner provided by law for referring to a jury issues in an equity action.

This act shall take effect immediately.

SECTION 5. *Stay of proceedings brought in violation of an arbitration agreement or submission.* If any suit or proceeding be brought upon any issue otherwise referable to arbitration under a contract or submission described in section 2, the supreme court, or a judge thereof, upon being satisfied that the issue involved in such suit or proceeding is referable to arbitration under a contract containing a provision for arbitration or under a submission described in section 2, shall stay the trial of the action until such arbitration has been had in accordance with the terms of the agreement.

SECTION 6. *Applications to be heard as motions.* Any application to the court, or a judge thereof, hereunder shall be made and heard in the manner provided by law for the making and hearing of motions, except as otherwise herein expressly provided.

NOTE: Under Chapter 341 of the Laws of 1923, enacted May 21, 1923, the following amendment to the arbitration act permits the courts to grant an open commission to take the testimony of non-resident witnesses, as in any other special proceeding:

SECTION 6-a. *Arbitration a special proceeding.* Arbitration of a controversy under a contract or submission described in section two shall be deemed a special proceeding, of which the court specified in the contract or agreement of submission, or if none be specified, the supreme court, shall have the like jurisdiction, for all purposes, as of a submission pursuant to article eighty-four of the civil practice act.

ARTICLE 3

NOTE: This article amends certain sections of the Code of Civil Procedure and repeals other provisions thereof and provides that the provisions of the Civil Practice Act regarding arbitration shall apply to arbitrations under this Act.

The provisions of the Civil Practice Act now in force follow:

CIVIL PRACTICE ACT (ART. 84)

Arbitration

SEC. 1448. *Submission to arbitration.* Except as otherwise described in this section, two or more persons may submit to the arbitration of one or more arbitrators any controversy existing between them at the time of the submission, which may be the subject of an action.

A submission of a controversy to arbitration cannot be made, either as prescribed in this article or otherwise, in either of the following cases:

1. Where one of the parties to the controversy is an infant, or a person incompetent to manage his affairs by reason of lunacy, idiocy or habitual drunkenness.

2. Where the controversy arises respecting a claim to an estate in real property, in fee or for life.

But where a person capable of entering into a submission has knowingly entered into the same with a person incapable of so doing, as prescribed in subdivision first of this section, the objection on the ground of incapacity can be taken only in behalf of the person so incapacitated.

The second subdivision of this section does not prevent the submission of a claim to an estate for years, or other interest for a term of years, or for one year or less, in real property; or of a controversy respecting the partition of real property between joint tenant or tenants in common; or of a controversy respecting the boundaries of lands or the admeasurement of dower.

SEC. 1449. *Contents of submission.* A submission authorized by the last section shall be in writing, duly acknowledged or proved, and certified, in like manner as a deed to be recorded. The submission may provide that a judgment of a specified court of record shall be rendered upon the award made pursuant to the submission. If the supreme court is thus specified, the submission may also specify the county in which the judgment shall be entered. If it does not, the judgment may be entered in any county.

SEC. 1450. *Appointment of additional arbitrator or umpire.* Where a submission is made as prescribed in this article, an additional arbitrator or an umpire cannot be selected or appointed unless the submission expressly so provides. Where

a submission made, either as prescribed in this article or otherwise provides that two or more arbitrators therein designated may select or appoint a person as an additional arbitrator, or as an umpire, the selection or appointment must be in writing. An additional arbitrator or umpire must sit with the original arbitrators upon the hearing. If testimony has been taken before his selection or appointment, the matter must be reheard, unless a rehearing is waived in the submission or by the subsequent written consent of the parties or their attorneys.

SEC. 1451. *Hearings by arbitrators.* Subject to the terms of the submission, if any are specified therein, the arbitrators selected as prescribed in this article must appoint a time and place for the hearing of the matters submitted to them, and must cause notice thereof to be given to each of the parties. They, or a majority of them, may adjourn the hearing from time to time upon the application of either party for good cause shown or upon their own motion, but not beyond the day fixed in the submission for rendering their award, unless the time so fixed is extended by the written consent of the parties to the submission or their attorneys.

SEC. 1452. *Oath of arbitrators.* Before hearing any testimony, arbitrators selected either as prescribed in this article or otherwise must be sworn, by an officer authorized by the law to administer an oath, faithfully and fairly to hear and examine the matters in controversy and to make a just award according to the best of their understanding, unless the oath is waived by the written consent of the parties to the submission or their attorneys.

SEC. 1453. *Power of arbitrators.* The arbitrators selected either as prescribed in this article or otherwise, or a majority of them, may require any person to attend before them as a witness; and they have, and each of them has, the same powers with respect to all the proceedings before them which are conferred upon a board or a member of a board authorized by law to hear testimony. All the arbitrators selected as prescribed in this article must meet together and hear all the allegations and proofs of the parties; but an award by a majority of them is valid unless the concurrence of all is expressly required in the submission.

SEC. 1454. *Fees and expenses of arbitrators.* Unless it is otherwise expressly provided in the submission, the award may require the payment, by either party, of the arbitrators' fees, not exceeding the fees allowed to a like number of referees in the supreme court; and also their expenses.

SEC. 1455. *Requirements as to award.* To entitle the award to be enforced, as prescribed in this article, it must be in writing; and, within the time limited in the submission, if any, subscribed by the arbitrators making it; acknowledged or proved, and certified, in like manner as a deed to be recorded; and either filed in the office of the clerk of the court in which, by the submission, judgment is authorized to be entered upon the award, or delivered to one of the parties or his attorney.

SEC. 1456. *Motion to confirm award.* At any time within one year after the award is made, as prescribed in the last section, any party to the submission may apply to the court specified in the submission for an order confirming the award; and thereupon the court must grant such an order unless the award is vacated, modified or corrected, as prescribed in the next two sections. Notice of the motion must be served upon the adverse party to the submission, or his attorney, as prescribed by law for service of notice of a motion upon an attorney in an action in the same court. In the supreme court, the motion must be made within the judicial district embracing the county where the judgment is to be entered.

SEC. 1457. *Motion to vacate award.* In either of the following cases, the court

specified in the submission must make an order vacating the award, upon the application of either party to the submission:

1. Where the award was procured by corruption, fraud or other undue means.
2. Where there was evident partiality or corruption in the arbitrators or either of them.
3. Where the arbitrators were guilty of misconduct in refusing to postpone the hearing upon sufficient cause shown, or in refusing to hear evidence pertinent and material to the controversy; or of any other misbehavior by which the rights of any party have been prejudiced.
4. Where the arbitrators exceeded their powers, or so imperfectly executed them, that a mutual, final and definite award upon the subject-matter submitted was not made.

Where an award is vacated, and the time within which the submission requires the award to be made has not expired, the court, in its discretion, may direct a rehearing by the arbitrators.

SEC. 1458. *Motion to modify or correct award.* In either of the following cases, the court specified in the submission must make an order modifying or correcting the award, upon the application of either party to the submission:

1. Where there was an evident miscalculation of figures, or an evident mistake in the description of any person, thing or property referred to in the award.
2. Where the arbitrators have awarded upon a matter not submitted to them, not affecting the merits of the decision upon the matters submitted.
3. Where the award is imperfect in a matter of form not affecting the merits of the controversy, and, if it had been a referee's report, the defect could have been amended or disregarded by the court.

The order may modify and correct the award so as to effect the intent thereof and promote justice between the parties.

SEC. 1459. *Notice of motion and stay.* Notice of a motion to vacate, modify or correct an award must be served upon the adverse party to the submission, or his attorney, within three months after the award is filed or delivered, as prescribed by law for service of notice of a motion upon an attorney in an action. For the purposes of the motion, any judge who might make an order to stay the proceedings in an action brought in the same court may make an order, to be served with the notice of motion, staying the proceedings of the adverse party to enforce the award.

SEC. 1460. *Costs on vacating award.* Where the court vacates an award, costs, not exceeding twenty-five dollars and disbursements may be awarded to the prevailing party; and the payment thereof may be enforced in like manner as the payment of costs upon a motion in an action.

SEC. 1461. *Entry of judgment on award and costs.* Upon the granting of an order confirming, modifying or correcting an award, judgment may be entered in conformity therewith, as upon a referee's report in an action, except as is otherwise prescribed in this article. Costs of the application and of the proceedings subsequent thereto, not exceeding twenty-five dollars and disbursements, may be awarded by the court in its discretion. If awarded, the amount thereof must be included in the judgment.

SEC. 1462. *Judgment-roll.* Immediately after entering judgment, the clerk must attach together and file the following papers, which constitute the judgment-roll:

1. The submission; the selection or appointment, if any, of an additional

arbitrator or umpire, and each written extension of the time, if any, within which to make the award.

2. The award.

3. Each notice, affidavit or other paper used upon an application to confirm, modify or correct the award, and a copy of each order of the court upon such an application.

4. A copy of the judgment.

The judgment may be docketed as if it was rendered in an action.

SEC. 1463. *Effect of judgment and enforcement.* The judgment so entered has the same force and effect, in all respects as, and is subject to all the provisions of law relating to, a judgment in an action; and it may be enforced as if it had been rendered in an action in the court in which it is entered.

SEC. 1464. *Appeals.* An appeal may be taken from an order vacating an award, or from a judgment entered upon an award, as from an order or judgment in an action. The proceedings upon such an appeal, including the judgment thereupon and the enforcement of the judgment, are governed by the provisions (of statute and rule regulating appeals in actions) as far as they are applicable.

SEC. 1465. *Death or incompetency of party.* Where a party dies (after making a submission either as prescribed in this article or otherwise), if the submission contains a stipulation authorizing the entry of a judgment upon the award, the award may be confirmed, vacated, modified or corrected, upon the application of, or upon notice to, his executor or administrator, or a temporary administrator of his estate; or, where it relates to real property, his heir or devisee who has succeeded to his interest in the real property. Where a committee of the property or of the person of a party (to a submission) is appointed, the award may be confirmed, vacated, modified or corrected, upon the application of or notice to, a committee of the property, but not otherwise. In a case specified in this section, a judge of the court may make an order extending the time within which notice of a motion to vacate, modify or correct the award must be served. Upon confirming an award, where a party has died since it was filed or delivered, the court must enter judgment in the name of the original party; and the proceedings thereupon are the same as where a party dies after a verdict.

SECS. 1466 to 1468 repealed.

SEC. 1469. *Application of this article.* This article does not affect any right of action in affirmance, disaffirmance, or for the modification of a submission, made either as prescribed in this article or otherwise, or upon an instrument collateral thereto, or upon an award made or purporting to be made in pursuance thereof. And, except as otherwise expressly prescribed therein, this article does not affect a submission made otherwise than as prescribed therein, or any proceedings taken pursuant to such a submission, or any instrument collateral thereto.

THE MASSACHUSETTS ARBITRATION ACT

Acts, 1925, Chapter 294

AN ACT RELATIVE TO THE ARBITRATION OF CONTROVERSIES BETWEEN PARTIES TO CONTRACTS

Be it enacted, etc., as follows:

SECTION 1. Controversies which might be the subject of a personal action at law or of a suit in equity may be submitted to the decision of one or more arbitrators, as provided in this chapter.

SECTION 2. The parties in person or by their lawful agents or attorneys shall sign an agreement in substance as follows:

Know all men that _____, and _____, hereby agree to submit the demand, a statement whereof is hereto annexed, (and all other demands between them, as the case may be,) to the determination of _____ and _____, the award of whom, or of a majority of whom, being made and reported within one year from this day to the superior court for the county of _____, the judgment thereon shall be final; and if either of the parties neglects to appear before the arbitrators, after due notice given to him of the time and place appointed for hearing the parties, the arbitrators may proceed in his absence.

Dated this _____ day of _____ in the year _____

.....
.....

SECTION 3. If a specific demand is submitted to the exclusion of others, it shall be set forth in the statement annexed to the agreement; otherwise it shall not be necessary to annex any statement of a demand, and the submission may be of all demands between the parties or of all demands which either has against the other. The submission may be varied in this respect in any other manner, according to the agreement of the parties.

SECTION 4. An agreement to submit all demands shall include only such as might be the subject of a personal action at law or of a suit in equity.

SECTION 5. The time within which the award shall be made and reported may be varied according to the agreement of the parties, but no award made after the time fixed by the agreement shall have any legal effect, unless made upon a recommitment by the court to which it is reported.

SECTION 6. Neither party may revoke the submission without the consent of the other; and if either neglects to appear after due notice, the arbitrators may hear and determine the cause *ex parte*.

SECTION 7. All the arbitrators shall meet and hear the parties, but an award by a majority of them shall be valid, unless the concurrence of all is expressly

required in the submission. In the case of the death of an arbitrator or of his inability or refusal to serve, the superior court shall, upon the application of either party, name an arbitrator in his stead.

SECTION 8. The award shall be delivered by one of the arbitrators to the court designated in the agreement, or shall be enclosed and sealed by the arbitrators and transmitted to the court, and shall remain sealed until opened by the clerk.

SECTION 9. The award may be returned at any time limited in the submission, and the parties shall attend without any express notice for that purpose; but the court may require actual notice to be given to either party before it acts upon the award.

SECTION 10. The court shall have cognizance of the award in the same manner, and may proceed thereon, as if it had been made by referees appointed by a rule of court, and may accept, reject or recommit it to the same arbitrators for a rehearing. When accepted and confirmed by the court, judgment shall be rendered thereon as upon a like award by referees.

SECTION 11. If there is no provision in the submission relative to costs and expenses, the arbitrators may make an award relative thereto, including compensation for their own services; but the court may reduce the charge for compensation. All expenses of arbitration under this chapter shall be borne by the parties.

SECTION 12. An appeal founded on matter of law apparent upon the record shall be allowed from any order or judgment of the superior court on an award made under this chapter; or a party aggrieved may bring a writ of error for any error in law or fact as in other cases. The supreme judicial court shall thereupon render such judgment as the court below ought to have rendered.

SECTION 13. Fees in court shall be the same as for like services relative to an award made under a rule of court.

SECTION 14. The parties to a contract may agree in writing that any controversy thereafter arising under the contract which might be the subject of a personal action at law or of a suit in equity shall be submitted to the decision of one or more arbitrators.

SECTION 15. Such an agreement may either name the arbitrator or arbitrators or may define the method by which an arbitrator or arbitrators are to be chosen. In case of the death, inability, or refusal to serve of any person so named, or in case the method of choosing arbitrators prescribed by the parties becomes impossible of performance because of the default of one of the parties or otherwise, or in case such agreement fails either to name or to provide a method for choosing an arbitrator or arbitrators, the superior court shall upon the application of either party, name an arbitrator or arbitrators.

SECTION 16. If a party to the contract be named as arbitrator, or the agent or agents or employee or employees of any one party to the contract be named in the contract or selected by the method therein defined as sole arbitrator or as a majority of the arbitrators under such agreement, the provisions of sections four-teen to twenty-two, inclusive, shall not apply.

SECTION 17. The submission shall be made within six months, unless otherwise stipulated by the parties, but in no event within less than a reasonable time, after due notice by any party to the contract claiming the arbitration of any controversy thereunder.

SECTION 18. If any one of the parties neglects to appear before the arbitrators

after due notice is given to him of the time and place appointed for hearing, the arbitrator or arbitrators shall proceed in his absence.

SECTION 19. The award of the arbitrator, or of a majority of the arbitrators, being made and reported to the superior court within one year from the date of the submission or within such further time as the court may upon the application of the arbitrator or arbitrators allow, the judgment thereon shall be final.

SECTION 20. Any question of law may, and upon the request of all parties shall, be referred by the arbitrator or arbitrators to the court to which the report is to be made. Upon application by a party at any time before the award becomes final under section nineteen, the superior court may in its discretion instruct the arbitrator or arbitrators upon a question of substantive law.

SECTION 21. If any suit or proceeding be brought upon any issue referable to arbitration under an agreement in writing for such arbitration, the court in which such suit is pending, upon being satisfied that the issue involved in such suit or proceeding is referable to arbitration under such an agreement, shall on application of either the plaintiff or defendant stay the trial of the suit or proceeding until such arbitration has been had in accordance with the terms of the agreement; provided, that the applicant for the stay is ready and willing to submit to arbitration.

SECTION 22. Proceedings under sections fourteen to twenty-one, inclusive, shall be governed by the provisions of sections six to thirteen, inclusive, not inconsistent therewith.

DRAFT STATE ARBITRATION ACT

Endorsed by the American Arbitration Association

AN ACT TO MAKE VALID AND ENFORCEABLE WRITTEN PROVISIONS OR AGREEMENTS FOR THE ARBITRATION OF DISPUTES

Be it enacted by, etc.

SECTION 1. *Validity of Arbitration Agreements.* A provision in any written contract to settle by arbitration a controversy thereafter arising out of such contract, or out of the refusal to perform the whole or any part thereof, or an agreement in writing between two or more persons to submit to arbitration any controversy existing between them at the time of the agreement to submit, shall be valid, irrevocable and enforceable, save upon such grounds as exist at law or in equity for the revocation of any contract; provided, however, that the provisions of this act shall not apply to collective contracts between employers and employees or between employers and associations of employees, in respect to terms or conditions of employment.

SECTION 2. *Stay of Proceedings Brought in Violation of Arbitration Agreement.* If any suit or proceeding be brought upon any issue referable to arbitration under an agreement in writing for such arbitration, the court in which such suit is pending, upon being satisfied that the issue involved in such suit or proceeding is referable to arbitration under such an agreement, shall on application of one of the parties stay the trial of the action until such arbitration has been had in accordance with the terms of the agreement, providing the applicant for the stay is not in default in proceeding with such arbitration.

SECTION 3. *Remedy in Case of Default — Jurisdiction — Petition and Notice — Hearing and Proceedings.* The party aggrieved by the alleged failure, neglect or refusal of another to perform under a written agreement for arbitration may petition any court of record having jurisdiction of the parties or of the property for an order directing that such arbitration proceed in the manner provided for in such agreement. Five days' notice in writing of such application shall be served upon the party in default. Service thereof shall be made in the manner provided by law for the service of a summons. The court shall hear the parties, and upon being satisfied that the making of the agreement for arbitration or the failure to comply therewith is not in issue, the court shall make an order directing the parties to proceed to arbitration in accordance with the terms of the agreement. If the making of the arbitration agreement or the failure, neglect, or refusal to perform the same be in issue, the court shall proceed summarily to the trial thereof. If no jury trial be demanded the court shall hear and determine such issue. Where such an issue is raised, either party may, on or before the return day of the notice of application, demand a jury trial of such issue, and upon such demand the court shall make an order referring the issue or issues to a jury called and impanelled in the manner provided for the trial of equity actions. If the jury find that no agreement in writing for arbitration was made or that there is no default in proceeding thereunder, the proceeding shall be dismissed. If the jury find that an agreement for arbitration was made in writing and that there is a default in pro-

ceeding thereunder, the court shall make an order summarily directing the parties to proceed with the arbitration in accordance with the terms thereof.

SECTION 4. *Appointment of Arbitrators.* If, in the agreement, provision be made for a method of naming or appointing an arbitrator or arbitrators or an umpire such method shall be followed; but if no method be provided therein, or if a method be provided and any party thereto shall fail to avail himself of such method, or if for any other reason there shall be a lapse in the naming of an arbitrator or arbitrators or an umpire, or in filling a vacancy, then upon the application of either party to the controversy the court aforesaid or the court in and for the (district or county) in which the arbitration is to be held shall designate and appoint an arbitrator or arbitrators or umpire, as the case may require, who shall act under the said agreement with the same force and effect as if he or they had been specifically named therein; and, unless otherwise provided in the agreement, the arbitration shall be by a single arbitrator.

SECTION 5. *Application Heard as Motions.* Any application to the court hereunder shall be made and heard in the manner provided by law for the making and hearing of motions, except as otherwise herein expressly provided.

SECTION 6. *Witnesses — Summoning — Compelling Attendance.* When more than one arbitrator is agreed to, all the arbitrators shall sit at the hearing of the case unless, by consent in writing, all parties shall agree to proceed with the hearing with a less number. The arbitrators selected either as prescribed in this act or otherwise, or a majority of them, may summon in writing any person to attend before them or any of them as a witness and in a proper case to bring with him or them any book, record, document, or paper which may be deemed material as evidence in the case. The fees for such attendance shall be the same as the fees of witnesses in courts of general jurisdiction. The summons shall issue in the name of the arbitrator or arbitrators, or a majority of them, and shall be signed by the arbitrator or arbitrators, or a majority of them, and shall be directed to the said person and shall be served in the same manner as subpoenas to appear and testify before the court; if any person or persons so summoned to testify shall refuse or neglect to obey said summons, upon petition the court in and for the (district or county) in which such arbitrators, or a majority of them, are sitting may compel the attendance of such person or persons before said arbitrator or arbitrators, or punish said person or persons for contempt in the same manner now provided for securing the attendance of witnesses or their punishment for neglect or refusal to attend in the courts of this State.

SECTION 7. *Depositions.* Upon petition, approved by the arbitrators or by a majority of them, any court of record in and for the (district or county) in which such arbitrators, or a majority of them, are sitting may direct the taking of depositions to be used as evidence before the arbitrators, in the same manner and for the same reasons as provided by law for the taking of depositions in suits or proceedings pending in the courts of record in this State.

SECTION 8. *Award.* The award must be in writing and must be signed by the arbitrators or by a majority of them.

SECTION 9. *Motion to Confirm Award — Jurisdiction — Notice.* At any time within one year after the award is made any party to the arbitration may apply to the court in and for the (district or county) within which such award was made, for an order confirming the award, and thereupon the court must grant such an order unless the award is vacated, modified, or corrected as prescribed in the next

two sections. Notice in writing of the application shall be served upon the adverse party or his attorney five days before the hearing thereof.

SECTION 10. *Motion to Vacate Award — Grounds — Rehearing.* In either of the following cases the court in and for the (district or county) wherein the award was made must make an order vacating the award upon the application of any party to the arbitration.

(a) Where the award was procured by corruption, fraud or undue means.

(b) Where there was evident partiality or corruption on the part of the arbitrators, or either of them.

(c) Where the arbitrators were guilty of misconduct in refusing to postpone the hearing, upon sufficient cause shown, or in refusing to hear evidence pertinent and material to the controversy; or of any other misbehavior by which the rights of any party have been prejudiced.

(d) Where the arbitrators exceeded their powers, or so imperfectly executed them that a mutual, final and definite award upon the subject matter submitted was not made.

Where an award is vacated and the time within which the agreement required the award to be made has not expired the court may, in its discretion, direct a rehearing by the arbitrators.

SECTION 11. *Motion to Modify or Correct Award — Grounds.* In either of the following cases the court in and for the (district or county) wherein the award was made must make an order modifying or correcting the award upon the application of any party to the arbitration.

(a) Where there was an evident material miscalculation of figures or an evident material mistake in the description of any person, thing, or property referred to in the award.

(b) Where the arbitrators have awarded upon a matter not submitted to them unless it is a matter not affecting the merits of the decision upon the matters submitted.

(c) Where the award is imperfect in matter of form not affecting the merits of the controversy.

The order must modify and correct the award, so as to effect the intent thereof and promote justice between the parties.

SECTION 12. *Judgment Upon Award.* Upon the granting of an order confirming, modifying or correcting an award, judgment may be entered in conformity therewith in the court wherein the order was granted.

SECTION 13. *Notice of Motions — When Made — Service — Stay of Proceedings.* Notice of a motion to vacate, modify, or correct an award must be served upon the adverse party or his attorney within three months after the award is filed or delivered, as prescribed by law for service of notice of a motion in an action. For the purposes of the motion any judge who might make an order to stay the proceedings in an action brought in the same court may make an order, to be served with the notice of motion, staying the proceedings of the adverse party to enforce the award.

SECTION 14. *Record — Filing — Judgment — Effect and Enforcement.* Any party to a proceeding for an order confirming, modifying or correcting an award shall, at the time such order is filed with the clerk for the entry of judgment thereon, also file the following papers with the clerk:

(a) The agreement, the selection or appointment, if any, of an additional arbi-

trator or umpire, and each written extension of the time, if any, within which to make the award.

(b) The award.

(c) Each notice, affidavit, or other paper used upon an application to confirm, modify, or correct the award, and a copy of each order of the court upon such an application.

The judgment shall be docketed as if it was rendered in an action.

The judgment so entered shall have the same force and effect, in all respects, as, and be subject to all the provisions of law relating to, a judgment in an action; and it may be enforced as if it had been rendered in an action in the court in which it is entered.

SECTION 15. *Appeals.* An appeal may be taken from an order confirming, modifying, correcting or vacating an award, or from a judgment entered upon an award, as from an order or judgment in an action.

SECTION 16. *Constitutionality.* If any provision of this act or the application thereof to any person or circumstances is held invalid, the validity of the remainder of the act and of the application of such provisions to other persons and circumstances shall not be affected thereby.

SECTION 17. *Title of Act.* This act may be referred to as "The (name of state) Arbitration Act."

SECTION 18. *Inconsistent Acts Repealed — Time of Taking Effect — Application.* All acts and parts of acts inconsistent with this act are hereby repealed, and this act shall take effect upon its enactment, but shall not apply to contracts made prior to the taking effect of this act.

UNIFORM ARBITRATION ACT

Endorsed by the American Bar Association in 1925

AN ACT CONCERNING ARBITRATION, TO MAKE UNIFORM THE LAW WITH REFERENCE THERETO

Be it enacted:

SECTION 1. Two or more parties may agree in writing to submit to arbitration, in conformity with the provisions of this act, any controversy existing between them at the time of the agreement to submit. Such an agreement shall be valid and enforceable, and neither party shall have the power to revoke the submission without the consent of the other party or parties to the submission save upon such grounds as exist in law or equity for the rescission or revocation of any contract.

SEC. 2. The arbitration agreement must state the question or questions in controversy with sufficient definiteness to present one or more issues or questions upon which an award may be based.

SEC. 3. The term "court" when used in this act means a court having jurisdiction of the parties and of the subject matter.

SEC. 4. Upon the application in writing of any party to the arbitration agreement and upon notice to the other parties thereto, the court shall appoint an arbitrator or arbitrators in any of the following cases:

(a) When the arbitration agreement does not prescribe a method for the appointment of arbitrators, in which case the arbitration shall be by three arbitrators.

(b) When the arbitration agreement does prescribe a method for the appointment of arbitrators, and the arbitrators, or any of them, have not been appointed and the time within which they should have been appointed has expired.

(c) When any arbitrator fails or is otherwise unable to act, and his successor has not been appointed in the manner in which he was appointed.

Arbitrators appointed by the court shall have the same power as though their appointment had been made in accordance with the agreement to arbitrate.

SEC. 5. Any application made under authority of this act shall be made in writing and heard in a summary way in the manner and upon the notice provided by law or rules of court for the making and hearing of motions [or petitions], except as otherwise herein expressly provided.

SEC. 6. The arbitrators shall appoint a time and place for the hearing, and notify the parties thereof, and may adjourn the hearing from time to time as may be necessary, and, on application of either party, and for good cause, may postpone the hearing to a time not extending beyond the date fixed for making the award.

SEC. 7. If any party neglects to appear before the arbitrators after reasonable notice the arbitrators may nevertheless proceed to hear and determine the controversy upon the evidence which is produced before them.

SEC. 8. If the time within which the award shall be made is not fixed in the arbitration agreement, the award must be made within sixty days from time of the appointment of the arbitrators, and an award made after the lapse of sixty days

shall have no legal effect unless the parties extend the time in which said award may be made, which extension or ratification shall be in writing.

SEC. 9. No one other than a party to said arbitration, or a person regularly employed by such party for other purposes, or a practicing attorney-at-law, shall be permitted by the arbitrator or arbitrators to represent before him or them any party to the arbitration.

SEC. 10. The arbitrator or arbitrators, or a majority of them may require any person to attend before him or them as a witness, and to bring with him any book or writing or other evidence.

The fees for such attendance shall be the same as the fees of witnesses in courts of general jurisdiction.

Summons [subpœna] shall issue in the name of the arbitrator or arbitrators, or a majority of them, and shall be signed by the arbitrator or arbitrators, or a majority of them, and shall be directed to the person and shall be served in the same manner as summons [subpœna] to testify before a court of records in this state, if any persons so summoned to testify shall refuse or neglect to obey such summons [subpœna], upon petition the court may compel the attendance of such person before the said arbitrator or arbitrators, or punish said person for contempt in the same manner now provided for the attendance of witnesses or the punishment of them in the courts of this state.

SEC. 11. Depositions may be taken with or without a commission in the same manner and for the same reason as provided by law for the taking of depositions in suits pending in the courts of record in this state.

SEC. 12. At any time before final determination of the arbitration the court may upon application of a party to the submission make such order or decree or take such proceeding as it may deem necessary for the preservation of the property or for securing satisfaction of the award.

SEC. 13. The arbitrators may, on their own motion, and shall by request of a party to the arbitration,

(a) At any stage of the proceedings submit any question of law arising in the course of the hearing for the opinion of the court, stating the facts upon which the question arises, and such opinion when given shall bind the arbitrators in the making of their award;

(b) State their final award in the form of a conclusion of fact for the opinion of the court on the questions of law arising on the hearing.

SEC. 14. The award of the arbitrators, or of a majority of them, shall be drawn up in writing and signed by the arbitrators or a majority of them; the award shall definitely deal with all matters of difference in the submission requiring settlement, but the arbitrators may, in their discretion, first make a partial award which shall be enforceable in the same manner as the final award; upon the making of an award, the arbitrators shall deliver a true copy thereof to each of the parties thereto, or their attorneys, without delay.

SEC. 15. At any time within three months after the award is made, unless the parties shall extend the time in writing, any party to the arbitration may apply to the court for an order confirming the award, and the court shall grant such an order unless the award is vacated, modified, or corrected as provided in the next two sections. Notice in writing of the motion must be served upon the adverse party, or his attorney, five days before the hearing thereof.

SEC. 16. In any of the following cases the court shall after notice and hearing

make an order vacating the award, upon the application of any party to the arbitration:

(a) Where the award was procured by corruption, fraud or other undue means.
(b) Where there was evident partiality or corruption in the arbitrators, or either of them.

(c) Where the arbitrators were guilty of misconduct, in refusing to postpone the hearing, upon sufficient cause shown, or in refusing to hear evidence, pertinent and material to the controversy; or of any other misbehavior, by which the rights of any party have been prejudiced.

(d) Where the arbitrators exceeded their powers, or so imperfectly executed them that a mutual, final, and definite award, upon the subject matter submitted was not made.

Where an award is vacated and the time, within which the agreement required the award to be made, has not expired, the court may, in its discretion, direct a rehearing by the arbitrators.

SEC. 17. In any of the following cases, the court shall after notice and hearing make an order modifying or correcting the award, upon the application of any party to the arbitration:

(a) Where there was an evident miscalculation of figures, or an evident mistake in the description of any person, thing or property, referred to in the award.

(b) Where the arbitrators have awarded upon a matter not submitted to them.

(c) Where the award is imperfect in a matter of form, not affecting the merits of the controversy.

The order must modify and correct the award, so as to effect the intent thereof.

SEC. 18. Notice of a motion to vacate, modify or correct an award shall be served upon the adverse party, or his attorney, within three months after an award is filed or delivered, as prescribed by law for service of notice of a motion in an action. For the purposes of the motion any judge who might make an order to stay the proceedings, in an action brought in the same court, may make an order to be served with the notice of motion, staying the proceedings of the adverse party to enforce the award.

SEC. 19. Upon the granting of an order, confirming, modifying, correcting or vacating an award, judgment or decree shall be entered in conformity therewith.

SEC. 20. The party moving for an order confirming, modifying, correcting or vacating an award shall at the time such motion is filed with the clerk, file, unless the same have theretofore been filed, the following papers with the clerk:

(a) The written contract or a verified copy thereof containing the agreement for the submission; the selection or appointment of the arbitrator or arbitrators, and each written extension of the time, if any, within which to make the award.

(b) The award.

(c) Every notice, affidavit, and other paper used upon an application to confirm, modify, correct or vacate the award, and each order made upon such an application.

The judgment or decree shall be entered [or docketed] as if it were rendered in an action.

SEC. 21. The judgment or decree so entered [or docketed] shall have the same force and effect, in all respects, as, and be subject to all the provisions of law re-

lating to, a judgment or decree; and it may be enforced, as if it had been rendered in the court in which it is entered.

SEC. 22. An appeal [or writ of error] may be taken from the final judgment or decree entered by the court.

SEC. 23. [Uniformity of interpretation.] This act shall be so interpreted and construed as to effectuate its general purpose to make uniform the law of those states, which enact it.

SEC. 24. [Short title-name of Act.] This act may be cited as the Uniform Arbitration Act.

SEC. 25. [Inconsistent laws repealed.] All acts or parts of acts inconsistent with this act are hereby repealed.

SEC. 26. [Time of taking effect.] This act shall take effect on [—————].

EXAMPLE OF A SUBMISSION

A. B. SMITH CONSTRUCTION COMPANY }
and } *Submission to Arbitration.*
X & Y RAILWAY COMPANY }

Whereas under an agreement dated the 3rd day of April, 1928 between the A. B. Smith Construction Company, a corporation of the State of New York, therein called the "Contractor," and the X & Y Railway Company, a corporation of the State of Pennsylvania, therein called the "Company," a copy of which is attached hereto and made a part hereof, the contractor agreed to do and perform the work therein particularly described in accordance with the specifications and plans annexed thereto and made an essential part thereof, at unit prices therein particularly specified,

And Whereas the contractor entered into and upon the performance of the said agreement and has proceeded therewith to completion,

And Whereas the contractor asserts a number of claims against the company, all of which are disputed, except certain claims amounting to \$—, as to which the company admits its liability,

And Whereas the parties having been unable to compose their differences with respect to said disputed claims, have agreed to submit the same to arbitration,

Now Therefore, the parties hereto do hereby submit their differences to arbitration pursuant to the law of the State of New York as follows:

The contractor does hereby name as its arbitrator John K. Jones, Esq. of Boston, Massachusetts.

The company does hereby name as its arbitrator Lewis B. Brown, Esq. of New York City.

Before proceeding to the arbitration the arbitrators above named shall designate in writing a third person as an additional arbitrator and before any testimony is taken all three arbitrators shall qualify by taking oath to fairly and impartially determine the questions submitted to them, to the best of their ability, and all testimony shall be heard by the three and the decision by two of them shall be binding and conclusive upon the parties.

The arbitrators shall hear and examine the matters in controversy and in fairness and justice shall finally determine the following questions and make decision and award thereon:

(Here is stated in explicit language the questions which are to be answered by the arbitration.)

The arbitrators may sit at any place within the County of Westchester or the County of New York designated by them and shall notify the parties of the time and place for the first hearing, by notice in writing, mailed to each of the parties at least five days before the hearing, as follows:

A. B. Smith Construction Company, 30 Church Street, New York City.

X & Y Railway Company, Philadelphia, Penn.

The arbitrators shall have the power to adjourn and hold adjourned hearings.

The parties shall each pay the fees and expenses of the arbitrator selected by each respectively, but the arbitrators shall determine and specify in their award which party shall pay the fees and expenses of the stenographer, or if both parties should pay the same, the proportion and amount that each should pay. In the meantime and as the arbitration progresses, each party shall pay one-half of the stenographer's fees, who is to furnish to the arbitrators the number of copies of the minutes required by them and a copy to each party.

To entitle the award to be enforced it must be in writing and it must be subscribed by a majority of the arbitrators, acknowledged, or proved and certified in like manner as a deed to be recorded, and filed in the office of the Clerk of the County of Westchester.

Either party may move to confirm the award and for Judgment under the provisions of the Civil Practice Act aforesaid.

In Witness Whereof the contractor and the company have caused these presents to be signed by their duly authorized officers and their respective corporate seals to be hereunto affixed, the 12th day of January, 1929.

A. B. SMITH CONSTRUCTION COMPANY

By
President.

Attest:

.....
Sec'y

X & Y RAILWAY COMPANY

By
Chairman, Board of Directors.

Attest:

.....
Sec'y

STATE OF NEW YORK }
COUNTY OF NEW YORK } ss:

On the 9th day of January, 1929, before me personally appeared to me known, who, being by me duly sworn, did depose and say that he resides in the City of New York, that he is President of the A. B. SMITH CONSTRUCTION COMPANY, the corporation described in and which executed the above instrument; that he knows the seal of the said corporation; that the seal affixed to the said instrument is such corporate seal; that it was so affixed by order of the Board of Directors of said corporation and that he signed his name thereto by like order.

.....
Notary Public.

New York County No. 333.
Certificate filed in Westchester Co.

STATE OF NEW YORK }
COUNTY OF NEW YORK } ss:

On the 12th day of January, 1929, before me personally appeared to me known, who, being by me duly sworn, did depose and say that he resides in the City of Plainfield, N. J., that he is the Chairman of the Board of Directors of the X & Y RAILROAD COMPANY, the corporation described in and which executed the above instrument; that he knows the seal of the said corporation; that the seal affixed to the said instrument is such corporate seal; that it was so affixed by order of the Board of Directors of said corporation and that he signed his name thereto by like order.

.....
Notary Public.

SUBMISSION AGREEMENT FORM OF AMERICAN ARBITRATION ASSOCIATION

AMERICAN ARBITRATION ASSOCIATION

..... }
 and } *Submission Agreement*
 }

We, the undersigned, hereby agree to submit to arbitration the following controversy:

We do hereby agree to submit such controversy for decision to arbitrator(s) selected from the Panel of the American Arbitration Association.

We further agree that the arbitration shall be conducted in accordance with the rules of the American Arbitration Association printed herein and pursuant to the New York Arbitration Law.

It is further agreed that we will abide by and perform any award rendered by the arbitrator(s); and that a judgment of the Supreme Court of the State of New York may be entered upon such award.

Signed.....

Signed.....

ACKNOWLEDGMENTS

CORPORATIONS

STATE OF NEW YORK }
 COUNTY OF } ss:

On this day of 192 ,
 before me personally came and appeared

to me known and known to me to be the person who executed the foregoing instrument, who, being duly sworn, did depose and say that he is the

of the above named corporation and that the seal affixed to the foregoing instrument is the corporate seal of said corporation and that he is duly authorized to sign and seal the said instrument in behalf of the said corporation by the authority of its Board of Directors and said

acknowledged said instrument to be the free act and deed of said corporation.

STATE OF NEW YORK }
 COUNTY OF } ss:

On this day of 192 ,
 before me personally came and appeared

to me known and known to me to be the person who executed the foregoing instrument, who, being duly sworn, did depose and say that he is the

of the above named corporation and that the seal affixed to the foregoing instrument is the corporate seal of said corporation and that he is duly authorized to sign and seal the said instrument in behalf of the said corporation by the authority of its Board of Directors and said

acknowledged said instrument to be the free act and deed of said corporation.

INDIVIDUALS

STATE OF NEW YORK }
COUNTY OF } ss:

On this day of 192 ,
before me personally came and appeared

to me known and known to me
to be the individual described in and who
executed the foregoing instrument, and
he duly acknowledged to me that he exe-
cuted the same.

STATE OF NEW YORK }
COUNTY OF } ss:

On this day of 192 ,
before me personally came and appeared

to me known and known to me
to be the individual described in and who
executed the foregoing instrument, and
he duly acknowledged to me that he exe-
cuted the same.

PARTNERS

STATE OF NEW YORK }
COUNTY OF } ss:

On this day of
192 , before me personally came and
appeared

to me known and known to me to be the
person who executed the above instru-
ment, who being duly sworn by me, did
for himself depose and say that he is a
member of the firm of

consisting of himself and

and that he executed the foregoing instru-
ment in the firm name of

and that he had authority to sign same,
and he did duly acknowledge to me that
he executed the same as the act and deed
of said firm of

for the uses and purposes mentioned
therein.

STATE OF NEW YORK }
COUNTY OF } ss:

On this day of
192 , before me personally came and
appeared

to me known and known to me to be the
person who executed the above instru-
ment, who being duly sworn by me, did
for himself depose and say that he is a
member of the firm of

consisting of himself and

and that he executed the foregoing instru-
ment in the firm name of

and that he had authority to sign same,
and he did duly acknowledge to me that
he executed the same as the act and deed
of said firm of

for the uses and purposes mentioned
therein.

American Arbitration Association, 342 Madison Avenue, Telephone Vanderbilt 1411

AMERICAN ARBITRATION ASSOCIATION

ARBITRATION RULES

(Applicable under the New York Arbitration Law)

Article VII, Section 3 of the By-Laws of the American Arbitration Association:

There shall be an Arbitration Committee of not less than three Directors, appointed by the President, which shall have general charge of the Arbitral Tribunal and which shall formulate rules for its conduct and decide upon the qualifications of arbitrators and nominate arbitrators for the consideration of the Executive Committee.

The arbitrators nominated by this Committee and appointed with the approval of the Executive Committee shall receive a certificate of appointment duly signed by the proper officer or officers of the Association. When called upon, they shall serve without compensation unless the parties to the controversy request that an exception be made and the approval of the Arbitration Committee be secured. Appointments to the National Panel of Arbitrators shall be for one year and may be renewed in the discretion of the Executive Committee upon the recommendation of the Arbitration Committee.

In accordance with the above provision, the Arbitration Committee adopts the following Rules, to be known as the American Arbitration Association Rules, for the settlement of disputes arising between its members, or between its members and non-members, or between non-members, who may wish to submit their differences hereunder.

1. *Duties of Secretary.* — The Arbitration Committee shall appoint a Secretary and such assistant secretaries as may be necessary. The Secretary shall render all necessary assistance to the Arbitration Committee, to the arbitrators or to the parties, and shall furnish, on application, the forms and papers required; and he shall obtain and file copies of all necessary documents. He shall receive all fees and disburse all moneys and keep a record thereof, under the supervision of the Arbitration Committee; and shall perform such other duties as it may prescribe.

2. *Initial Proceedings.* — Any party desiring to arbitrate under these rules and/or to use the facilities provided by the American Arbitration Association shall notify the Secretary, indicating in writing the nature of the controversy. Immediately upon receipt of such notice the Secretary will ascertain whether the dispute arises under a clause in a contract, or otherwise. He shall notify the defending party and endeavor to secure within a period of seven days his consent to the arbitration. When the defending party consents to arbitration, the parties shall agree upon the number of arbitrators to be selected. The parties shall then execute a submission.

3. *Submission.* — The Submission shall be prepared in triplicate, in form provided by law. One copy shall be acknowledged before a Notary Public or other duly authorized public officer and shall be filed with the Secretary; each party shall be entitled to a copy. When the submission is not signed by the principal, the Arbitration Committee may require proof of the authority of the person signing.

The Submission shall contain an accurate and concise statement of the matter in controversy, together with a sufficient description of the commodity, if any be involved, to permit its identification by the arbitrators, and it shall specify the rules under which the arbitration is to be conducted. The Submission shall specify that the parties agree to abide by the award and to the entry of the judgment thereon in the court having jurisdiction.

4. *Appointment of Arbitrators.* — The parties may select by agreement one or more arbitrators. The Secretary shall submit to each party an identical list of names from which the parties may select an arbitrator or arbitrators. Whenever the parties are proceeding under these Rules, and either or both fail, within a period of seven days from the receipt of such list or lists, to make a selection therefrom, the Arbitration Committee shall appoint the arbitrator or arbitrators.

Arbitrators shall be drawn from the National Panel, but selection need not be confined to such Panel if the parties agree upon a qualified person or persons whose name (or names) is not contained thereon.

5. *Qualifications of Arbitrators.* — No member of the National Panel, nor any other person called upon to act as arbitrator, shall serve in any case wherein he has a personal or financial interest, or any secret interest, or any preconceived opinion which would constitute a bias in favor of or in opposition to either party; or whenever his past or present business connections with either party are such as to imperil the impartiality of his award. The parties may, however, waive in writing any objections which might exist on the preceding grounds. In the event of a dispute arising concerning such qualification the decision of the Arbitration Committee shall be final.

6. *Vacancies.* — The Arbitration Committee shall have power to declare the position of any arbitrator vacant by reason of illness, death, resignation, or any other inability to act, or upon refusal, neglect or other disqualification, and its decision shall be final. Vacancies shall be filled in the same manner as the original appointment; provided, however, that when the parties fail to agree the Arbitration Committee shall fill such vacancy.

Upon appointment of any new arbitrator he and the remaining arbitrators shall meet and agree as to the manner of conducting and proceeding with the arbitration in view of the substitution of arbitrator; but if the arbitrators fail, neglect or refuse to agree, within such time as the Arbitration Committee may deem reasonable, then the Arbitration Committee shall make a rule or order in accordance with which the arbitrators shall proceed; and such rule and order shall be final, conclusive and binding on all the parties.

7. *Oath of Arbitrators.* — Before proceeding with the first hearing in the controversy, each arbitrator shall take an oath faithfully and fairly to hear and examine the matters in controversy, and to make a just award according to the best of his understanding. If the parties waive this requirement in writing, the oath need not be administered.

8. *Hearings.* — Hearings shall be held as soon as practicable, the Secretary allowing a notice of five days to all persons required to be present. Hearings shall be held at the offices of the American Arbitration Association or at any place convenient to the parties, or at any place where the commodity, if any be involved, may be readily examined. No hearing shall be held on the premises of either party unless the parties mutually agree as to such premises.

The proceedings shall not be public unless so authorized by the parties. Mem-

bers of the Arbitration Committee and the Secretary, or any other persons authorized by the Arbitration Committee or agreed upon by both parties or required by the arbitrators, may be present at any of the hearings. Either party, if he so desires, may be represented by counsel; but where such is his intention he shall notify the Secretary three days prior to the date set for the first hearing. The Secretary will immediately notify the other party in order that he may avail himself of a like privilege.

Arbitration records shall be open on the written order of the Arbitration Committee or upon the mutual agreement of the parties.

The arbitrators shall hear first the complaining party and his witnesses; then the defending party and his witnesses. All evidence shall be taken in the presence of both parties. Each party shall have the amplest opportunity of establishing his claim and no restriction shall be placed upon either party which might tend to prejudice his interests. The arbitrators may reject any and all evidence which they consider immaterial and/or irrelevant.

The arbitrators may require all persons testifying to be sworn but, in their discretion, the oath may be waived by the mutual consent of the parties — in which case such waiver shall be recorded in the minutes of the hearing. In the conduct of the hearings legal rules of evidence or other technical requirements need not be observed.

Stenographic records of testimony will not be taken unless either or both parties so request and provide funds for the same.

Whenever a party proceeding under these rules shall, without good cause, fail to be present or to be represented at a hearing of which he has been properly notified, the arbitrators may proceed with the hearing notwithstanding such party's absence.

9. *Waiver of Oral Hearings.* — If the parties to a controversy, having executed the Submission, agree in writing to waive oral hearings, they shall submit to the Secretary their contentions in writing, including a statement of fact, all written documents, statements from books of account or other evidence, all properly verified under oath, together with written arguments, and samples of commodities (where questions of quality, size, etc., are involved). Upon receipt of the statement of facts and written arguments, the Secretary shall submit immediately a copy thereof to the respective parties and each shall have the right to make one reply thereto; but if either party shall fail to make such reply within seven days from the receipt thereof, he shall be deemed to have waived the right of reply. The file together with all the evidence shall then be submitted to the arbitrators.

10. *Fees From Parties.* — When the parties have agreed to arbitrate, each party shall pay to the Secretary the following sums based upon the amount of the claim:

Up to and including \$2000.	— \$10. from each party.
From \$2000. to \$5000.	— 20. from each party.
Over \$5000.	— 25. from each party.

For each additional hearing each party shall pay an additional sum equal to one-half of the fee paid for the first hearing. Where the controversy is settled or the arbitration proceedings are terminated before the first hearing or, where oral hearings are waived, before the presentation of evidence, one-half of the fees deposited shall be returned to the parties by the Secretary. When the arbitration

involves special expenses, these shall be paid in equal shares by the parties. The Arbitration Committee may, in its discretion, remit the fees, or any part thereof.

11. *Fees for Arbitrators.* — Arbitrators chosen from the National Panel shall serve without compensation, unless the parties enter into a special agreement to the contrary. Arbitrators shall, however, be reimbursed for actual expenses.

12. *Awards.* — The award of the arbitrators shall be made within twenty days after the hearings have been completed and the arbitrators have declared the proceedings closed (or, if oral hearings have been waived, after all of the arbitrators have received the file), provided that the time may be extended by the mutual consent of the parties. If no award has been made within the time specified, the positions of the arbitrators shall be declared vacant by the Arbitration Committee. The award must be definite, certain, complete, and unambiguous; it shall determine specifically each point in controversy as set forth in the Submission and it shall not refer to any matter not so submitted. In the discretion of the arbitrators, the award may include the reasons for the conclusions reached. An award by a majority of the arbitrators shall be valid and binding. The award shall be made in writing and, after acknowledgment before a Notary Public or other duly authorized public officer, shall be filed with the Secretary who shall immediately furnish each party with a copy.

Upon proper request, the Secretary shall furnish to either party, should such party desire it for the purposes of court proceedings, the full file containing among other things the executed copies of the award and of the Submission.

13. *Default Under Agreement to Arbitrate.* — When the claim submitted to the Secretary arises out of a submission or a written contract containing an arbitration clause, the procedure shall be as follows:

Whenever the defaulting party (a) refuses to signify his willingness to arbitrate, or (b) refuses to attend, or to state or defend his case before the arbitrators at a properly designated hearing, the Secretary shall notify the other party of such default and shall inform him concerning the provisions of the Arbitration Law.

14. *Interpretation of Rules.* — Arbitrators shall apply these Rules in the manner best calculated to obtain a just and speedy determination of the controversy. Whenever a difference arises among the arbitrators concerning the interpretation of these Rules or concerning any matter not specifically covered by these Rules, the question shall be referred to the Arbitration Committee, and its decision shall be final.

15. *Special Rules.* — Whenever the foregoing Rules are not fully applicable or whenever an unusual or unforeseen situation arises, the Arbitration Committee, at the request of the parties, may adopt Special Rules to cover such conditions and in case of conflict between the foregoing Rules and such Special Rules the Special Rules shall prevail.

16. *Amendments.* — The Arbitration Committee may from time to time amend these Rules as it finds necessary.

(As Amended: April 1st, 1928)

Note: — Any organization which desires to use this Submission form or these Rules should first consult the American Arbitration Association which will advise concerning certain changes which may be necessary in order to make them fully adaptable to a particular trade or to conform to state laws.

OATH OF ARBITRATION

In the matter of the
Arbitration between: }
..... } *Oath of Arbitration*
..... }

STATE OF NEW YORK }
COUNTY OF NEW YORK } ss:

John K. Jones, Esq., being duly sworn deposes and says that he will faithfully and fairly hear and examine the matters in controversy between the above named parties in accordance with the agreement of Submission heretofore executed by them, and that he will make a just award according to the best of his understanding.

JOHN K. JONES,
Arbitrator.

Sworn to before me this 10th day of April, 1928.

JOHN H. GRAY,
Notary Public.

FORM OF FINDINGS AND AWARD FOR SINGLE ARBITRATOR

In the matter of the
Arbitration between: }
..... } *Findings and Award of Arbitration*
..... }

The undersigned constituting the duly authorized arbitrator designated in the submission to Arbitration duly executed and acknowledged and dated the 10th day of July, 1928, to whom was voluntarily submitted matters in controversy between the parties above named, and

WHEREAS, the said arbitrator having been duly sworn according to the law and having duly heard the proofs and allegations of the disputants, and having carefully considered all evidence presented, does hereby make this his FINDINGS and AWARD, as follows: — (Insert findings in detail.)

.....
Arbitrator.

COUNTY OF NEW YORK }
STATE OF NEW YORK } ss:

On this 20th day of August, 1928, before me personally came and appeared to me known and known to me to be the individual described in and who executed the foregoing instrument, and he duly acknowledged to me that he executed the same.

JAMES L. KNOX.
Notary Public.

SUBPOENA FOR RECORDS — DUCES TECUM FORM

Commonwealth of Massachusetts

..... ss:

To

GREETING.

YOU ARE HEREBY REQUIRED, in the name of the Commonwealth of Massachusetts, to appear before the.....Court.....
 holden at.....within and for the county of.....
 on the.....day of.....at
o'clock in the.....noon, and from day to day thereafter,
 until the action hereinafter named is heard by said Court, to give evidence of what
 you know relating to an action of.....then and there to be heard and
 tried between.....Plaintiff , and
Defendant , and
 you are further required to bring with you.....

HEREOF FAIL NOT, as you will answer your default under the pains and penalties in the law in that behalf made and provided.

Dated at.....the.....day of.....
 A.D. 19.....

.....
Justice of the Peace.

OF GENERAL INTEREST

REFERENCE WORK IN THE FIELD OF SANITARY ENGINEERING *

By Ruth Canavan †

There is probably no profession less understood or so difficult to define as that of sanitary engineering. The general conception seems to be that it has "something to do with plumbing," and by "plumbing" most people understand the mysterious but very necessary system of piping that brings into our houses and buildings the water supply and conveys away the waste waters. Where these waste waters eventually go is a matter not even of conjecture to most people. It is a case of "out of sight, out of mind." And so it is that that very able and carefully trained public servant, the sanitary engineer, is not known to the general public, and his activities remain to them a mystery. It is to be regretted that the more efficient his activities, the less evident they become. His fine work in eliminating substances and conditions which if they were not taken care of would be detrimental to the health and welfare of the whole community, receives all too inadequate recognition.

So the sanitary engineer, leaving to the plumber the complications of drain-

age and piping inside our buildings, concerns himself with the building of extensive water distribution systems, reservoirs, dams and standpipes, and with the vast network of sewers which serve our communities. These sewerage systems receive not only drainage from house and building connections, but also industrial wastes and in some cases storm water runoff.

Having collected all this noxious putrescible conglomeration the sanitary engineer then has the delightful task of disposing of it, and of doing so in such a way that no offence will be occasioned either to the community contributing the sewage or to other neighboring communities, as, for instance, those which might suffer from its discharge untreated into an inadequate water course. So he has devised various methods of treatment, their complexity depending upon the degree of purification necessary before ultimate disposal. Of course, where there is an ocean available, a large lake, or an ample water course, an outfall sewer can be provided through which the sewage may be dis-

* Reprinted from Special Libraries, Vol. 20, No. 2, February, 1929.

† Librarian, Metcalf & Eddy, Boston, Mass.

charged untreated, or possibly with just the additional refinement of a screen by which the coarser organic matter is removed. In other instances, however, intensive treatment may be required in order to produce a clear, odorless effluent and to reduce the offensive solids to stable earthy material.

There are various processes for obtaining the desired degree of purification, and they are extremely interesting, but too complicated to be explained here. They all, however, depend very largely upon bacterial activity, either aerobic or anaerobic, for the reduction of the organic matter to a material which is odorless and non-putrefactive. This makes a knowledge of bacteriology essential to the sanitary engineer. He must have also the structural knowledge of the civil engineer, and some understanding of mechanical engineering, in order to design the details of his treatment plants and other structures.

In the design of his sewerage system allowance frequently has to be made for storm water, and this entails a study of meteorology to the extent that he must be able to prophesy the frequency of storms and the amount and intensity of precipitation to be expected. There are legal questions which arise in connection with rights of way, contractors' claims, responsibility for the surcharging of sewers and consequent flooding, liability for the dissemination of odors from treatment plants, or for pollution of streams by the discharge of sewage to the detriment of the health and welfare of communities below.

But, as has been hinted above, the sanitary engineer not only does away with waste waters, he supplies also the waters that later go to waste. It is to the sanitary engineer that the community turns for advice as to a proper and adequate source of water supply and the best means of distributing it. It

is he who investigates possible sources of supply, has test wells put down, examines promising dam sites, gauges stream flow, and tests out the quality of available waters. Here, again, he is confronted with the legal aspect. There are riparian rights to be considered, diversion damages, and compensation "in kind" (as by a compensating reservoir). Again he is dragged (but not unwillingly, because legal work has its compensations, and not "in kind") before the stern judicial eye, to testify in a rate suit, to give evidence as to an equitable figure to be paid for a water company which is to be taken over by a municipality, or a just price to be charged by a city for supplying water to a suburban district. So in connection with the water works' end of his profession the sanitary engineer must know something of the law, something of chemistry and something of public health, for there are water-borne epidemics to be taken into account and provided against, such as typhoid and anthrax, and there is the danger of pollution of water sources and of contamination of the supply during distribution.

In recent years, with the development of garbage and refuse disposal, the sanitary engineer has been getting more and more involved in a consideration of this fascinating problem, which presents almost as great possibilities in the way of complexity as the sewage disposal problem, and even greater promise of the recovery of by-products. The recovery of by-products in the sewage disposal field has so far been limited to utilizing the treatment plant solids as fertilizer; either turning this substance over in a semi-liquid state to farmers for ploughing into their agricultural fields, or, after rather complicated treatment which includes pressing, drying and grinding, putting it on the market as

commercial fertilizer base. In the garbage reduction plants grease is recovered by a somewhat complicated process; in the incinerators the slag from the furnaces has been utilized for making concrete, and steam has been generated; and especially in England very efficient systems of refuse picking and separating have been installed, whereby all the usable materials are redeemed.

In connection with the recovery of by-products it might be of interest to add that the latest development in the sewage disposal field is the recovery of the gas generated by the action of bacteria upon the putrescible organic matter in tanks, which results in the breaking down of this substance into earthy stable matter. These tanks are supplied with gas vents, the gas collected and utilized for burning about the plant. In some instances, notably in Germany, the gas is being piped to the municipal gas plant and sold.

As an adjunct to and supplementing the municipal sewage treatment plant the sanitary engineer also designs residential, institutional and industrial plants, where it has not seemed feasible or desirable to make connection with the municipal system. The problem of industrial wastes disposal is extremely varied and almost unlimited in its possibilities of development along the line of the recovery of by-products. To solve a problem of this sort the sanitary engineer must inform himself as to the process of manufacture in question, and must determine the character and the quantity of the wastes to be expected from every step in that process. He must know all the waste waters that would come from a woolen mill, from a tannery, from a laundry, from pickling works, etc., and be prepared not only to provide a way of satisfactorily disposing of these greasy, alkaline or acid wastes, but of saving

such substances as are worth saving and as it is economically practicable to recover.

The sanitary engineer cannot be merely a theorist or an idealist. The financial aspect has ever to be considered; the economic features always must be faced. No manufacturer wants to pay more for the recovery of a product than its value justifies, nor does a municipality want to go to refinements of treatment when disposal by dilution is perfectly practicable.

Above all, the sanitary engineer is an economist. Moreover, if he makes the people in a community pay taxes for something that they never see, the health of that community depends upon their paying those taxes. For without his activities in ensuring a safe and dependable water supply and freedom from the pestilence and liability to disease which have always inevitably attended lack of sanitation, the doctors would have no time and no encouragement to devote themselves to the avoidance of what might be termed the more "refined" diseases of the present day, in contrast to the terrible plagues and scourges of the eighteenth century, before the need for sanitation became recognized.

From the foregoing description of the scope of the sanitary engineering field some comprehension may be gained as to the variety of questions which the reference worker in this field is called upon to answer. Perhaps the most usual and frequent are those relating to construction methods and equipment, and progress in the art. These can be answered by reference to the handbooks, textbooks or periodical articles. Industrial Arts Index and Engineering Index are helpful, and also United States Public Health Engineering Abstracts and Chemical Abstracts. Then there are the less scientific questions, such as checking up addresses,

names of city officials, populations, dates, etc., for which The World Almanac, Municipal Index, Hendricks' Commercial Register, Sweet's catalogs (Engineering and Architectural), Chemical Catalog, society membership lists and directories are useful. For legal citations Public Utilities Reports Annotated is reliable, and reference is made to acts and resolves and to court decisions of the various states and the Federal courts. The patent file, both United States and foreign, is often consulted. United States Geological Survey publications and those of the United States Department of Agriculture are popular, as well as the bulletins issued by the engineering experiment stations of the various colleges. A classed index to take the place of the subject index has given good service for the past year.

As the scope is so extensive, it is necessary to depend upon the co-operation and hospitality of neighboring libraries, to know, for instance, that through the courtesy of the ever genial Mr. Handy, one may consult a complete file of Fire Underwriters reports, unobtainable elsewhere; that the Boston Society of Civil Engineers' library is the best bet for city and town reports; that the Boston Medical Library is open three evenings a week, and that the Boston Society of Natural History has some unsuspected riches in the way of geological data and maps.

So it is that in doing reference work in the field of sanitary engineering, which is so closely related to other fields, the librarian appreciates very much the privilege of occasionally trespassing, and the opportunity which The Special Libraries Association offers for becoming conversant with the resources of other libraries and of getting acquainted with those in charge of them. The attending of the meetings of the

local chapter becomes, therefore, not only a personal gratification in the meeting of pleasant friends; it is an education and an inspiration. It may almost be said to be a professional necessity.

MEMOIR

Francis Carlile Tucker *

DIED FEBRUARY 10, 1929

Francis Carlile Tucker was born in Brooklyn, New York, March 23, 1844, and was the son of William Kirkby and Emily Jane (Newman) Tucker. He was educated at Boston Latin School and was a graduate of the Boston English High School.

On July 30, 1862, Mr. Tucker enlisted in the ninth Massachusetts Artillery, serving with this battery until April 18, 1864. His record at Gettysburg was heroic. Single-handed he saved his guns in the Peach Orchard from being captured during the Longstreet charge, when his comrades of the battery were all killed or wounded. He was mustered out on August 18, 1864, to accept a lieutenancy in a New Jersey regiment, but this was so shot to pieces that it was disbanded. On December 20 Mr. Tucker re-enlisted in his old battery and served until the end of the war.

Upon his discharge from the army Mr. Tucker entered the office of J. B. Henck, at that time professor of civil engineering in the Massachusetts Institute of Technology. At field work all day, studying at night and attending evening lectures at Technology, he became an engineer in the best sense of the word. His early work included charge of operation in the filling of the Back

* Memoir prepared by E. W. Henck, Longwood, Florida.

Bay, park work and railroad work on the Fitchburg and Boston & Providence railroads.

When Roxbury was annexed to Boston Mr. Tucker took charge of a branch office in the Highlands, and made complete maps of the annexed district. Later Mr. Tucker opened a private office at Natick, Massachusetts, in partnership with E. W. Henck, C.E.

During construction of the Sudbury River Conduit he was division engineer, his work being rated as the best.

In 1879, 1880, and early part of 1881 he was chief engineer on the construction of the South Florida Railroad. In 1882 and 1883 he was resident engineer of the Northern Pacific Railroad, constructing the tunnel at Summit. In 1884 and 1885 he was resident engineer of the Oregon Pacific Railroad, and from 1885 to 1896 he was with the Burlington & Missouri Railroad, in the same capacity. He was with the Union Pacific Railroad, 1900-02.

In 1902 Mr. Tucker opened a private

office at Deadwood, South Dakota, as consulting engineer, and engaged in civil and mining practice. He retired in 1912, residing at Chicago until 1926, when he moved to Longwood, Florida.

May 16, 1867, Mr. Tucker married Emmaline Frances Fisher of Southborough, Massachusetts, by whom he had five children, — William F., Louisa F., Francis F., Carlile F., and Henry R. All but the eldest are now living. Mrs. Tucker died May 26, 1902. On June 24, 1903, Mr. Tucker married Lucie Elizabeth Shumate of Staunton, Virginia, who survives him.

Mr. Tucker became a member of the Boston Society of Civil Engineers in 1875. He was a comrade of the Grand Army of the Republic.

Mr. Tucker was an honor to his profession, — able, efficient, thorough and a master of men; clean living and the soul of honor.

PROCEEDINGS OF THE SOCIETY

MINUTES OF MEETINGS

Boston Society of Civil Engineers

MARCH 20, 1929. — The eighty-first Annual Meeting of the Boston Society of Civil Engineers was held today at the Boston City Club, and was called to order by the President, Charles B. Breed, at 5.20 P.M.

The reading of the minutes of the previous meeting (Feb. 20, 1929) was omitted, as these are printed in the March JOURNAL.

The Secretary reported for the Board of Government the names of those elected to membership:

Grade of Member: Andrew Canzanelli, Frank H. Mason, Daniel Sayre, Myron H. Smith.

Grade of Junior: George A. Bernat, Terrence M. Burak, John J. Campobasso, John H. Harding, Carl A. Magnuson, George E. Rice, Albert A. Roberts.

The President reported the death of the following members: Fred B. Forbes, died Jan. 26, 1929, a member since March 16, 1904; Frank H. Mills, died Feb. 2, 1929, a member since Dec. 21, 1898; Francis C.

Tucker, died Feb. 10, 1929, a member who had taken part in the revival of the activities of the Society on June 8, 1874; and Fayette S. Curtis, died Feb. 15, 1929, a member since Feb. 7, 1915. The President stated that committees would be appointed to prepare memoirs.

The annual reports of the Board of Government, Treasurer, Secretary, Committees on Social Activities, Library, Subsoils of Boston, and Flood were presented.

It was *Voted* that these reports be accepted and placed on file. The President announced that they would be published in the April JOURNAL.

It was *Voted* that the incoming Board of Government be authorized to appoint such committees as it deemed advisable.

Mr. C. A. Farwell presented the report of the Tellers of Election, and in accordance therewith the President announced that the following officers had been elected for the ensuing year:

President — Frank E. Winsor.
Vice-President (for two years) — Harry E. Sawtell.

Secretary — Everett N. Hutchins.

Treasurer — Frank O. Whitney.

Directors (for two years) — Arthur L. Shaw, Henry A. Varney.

Members of Nominating Committee (for two years) — C. Frank Allen, Frank C. Shepherd, John L. Howard.*

The President introduced Frank E. Winsor, the newly elected President, who responded briefly.

The Society *Voted* that the following resolution be adopted and that an engrossed copy be presented to Professor Babcock, the retiring Secretary:

The Boston Society of Civil Engineers regrets that Professor Babcock's other interests are such that he cannot continue to serve as secretary.

We feel that the Society has been fortunate in having the services of a man of Professor Babcock's energy and ability, and feel that much of the success which the Society has attained has been due to this fact.

The Society wishes to extend to Professor Babcock its gratitude for the work which he has done while in this office.

The President, Charles B. Breed, stated that the special committee on the award of the Desmond FitzGerald Medal reported that in its opinion there were no papers presented this year that were of such a character as to merit this award, and that the Board of Government had voted to adopt the recommendation that no award of the Desmond FitzGerald Medal be made this year.

The President announced that the Sanitary Section prize of books, suitably inscribed, had been awarded to Frank A. Marston for his paper on "Progress in Sewage Treatment Abroad," presented before the Sanitary Section on December 7, 1927, and published in the June, 1928, JOURNAL. Professor Gordon M. Fair, Chairman of the Sanitary Section Prize Committee, made the presentation to Mr. Marston. The President stated that there had been no papers eligible for prizes this year in the other sections.

The President announced that the Board had voted to award copies of Clemens Herschel's book, entitled "Frenetinus and the Water Supply of the City of Rome," to Edward H. Cameron for his paper on "Engineering Features of a Modern Glass Bottle Plant," published in the June, 1928, JOURNAL; and to Willem Rudolfs for the paper on "Sludge Digestion," presented before the Sanitary Section on December 5, 1928, and published in the January, 1929, JOURNAL.

Mr. E. H. Rogers, Chairman of the special committee, made the presentation to Mr. Cameron. Mr. Rudolfs was unable to be present to receive his award in person.

The President introduced Dr. Theodor Rehbock, Professor of Hydraulics at the Technische Hochschule of Karlsruhe, Germany, who has recently arrived in this country to deliver a series of lectures on "Hydraulic Experimentation" under the auspices of the Civil Engineering Depart-

* John L. Howard and John E. Carty received a tie vote on the letter ballot, and, in accordance with the By-Laws, a ballot was taken on these two names at the Annual Meeting of the Society and John L. Howard was elected.

ment of the Massachusetts Institute of Technology.

Dr. Rehbock expressed his appreciation of the opportunity to attend the annual meeting of the Society.

The retiring President, Charles B. Breed, then presented his annual address on "The Function of the Engineer in Arbitration Proceedings."

The business meeting adjourned at 6.30 P.M., and the members attended the dinner and entertainment arranged by the Committee on Social Activities. During dinner music was furnished by the Northeastern University Orchestra.

After a half-hour period for the members to get together, Hunter Rouse, a senior civil engineering student at Massachusetts Institute of Technology, gave an excellent ventriloquist act.

Prof. Frederick K. Morris of the Geology Department of Massachusetts Institute of Technology then gave a talk on "Desert Magic," illustrated by colored slides.

There were 225 members and guests present.

Adjourned at 9.15 P.M.

J. B. BABCOCK, *Secretary*.

Sanitary Section

MARCH 6, 1929. — Preceding the meeting, an informal dinner was held at Paten's Restaurant, at which 22 members and guests were present.

The meeting was called to order by the Chairman at 7.15 P.M. and the report of the Executive Committee was read and accepted.

The report of the Nominating Committee was read by Mr. A. D. Weston, Chairman. It was voted to instruct the Chairman to cast one ballot for the nominees presented by the Nominating Committee. The officers nominated were duly elected.

Mr. Robert Spurr Weston gave an illustrated talk on "Some Examples of Stream Pollution by Industrial Wastes." This paper was discussed by Messrs. Fales, Wright, Fair, Kingsbury, Chase, Griffin and Houser.

The attendance was 40.

The meeting adjourned at 9.15 P.M.

STUART A. COBURN, *Clerk*.

Designers Section

MARCH 13, 1929. — Chairman W. D. Henderson called the meeting to order at 6.10 P.M. The clerk then read the minutes of the previous meeting which were accepted.

As this was the annual meeting, the Chairman called for the report of the Nominating Committee appointed at the February meeting. The following nominations were submitted by the Committee:

Chairman — C. Hale Sutherland.

Vice Chairman — Erwin Harsch.

Clerk — Norman P. Randlett.

Executive Committee — Oliver B. Brown, Kimball R. Garland, Eugene Mirabelli.

The report having been accepted and no further nominations being made it was moved and seconded that the nominations be closed and that the clerk be instructed to cast one ballot for the candidates selected by the Nominating Committee. The motion was carried and the nominees of the Nominating Committee were elected.

Mr. Henderson, the retiring Chairman, outlined briefly the work of the past year, and expressed his appreciation of the co-operation of the officers and the members of the Executive Committee. The meetings held during his administration he briefly reviewed, explaining that each officer and member of the Executive Committee had assumed the responsibility of securing speakers for at least one meeting.

A discussion of the 1928 Joint Standard Building Code of the American Concrete Institute was the subject of the meeting. Mr. Henderson introduced the following speakers, who talked on different sections of the Code:

Chapters 1 to 5, inclusive — Prof. Dean Peabody, Jr., Massachusetts Institute of Technology.

Chapters 6 to 9, inclusive — Prof. Hale Sutherland, Massachusetts Institute of Technology.

Chapters 10 to 12, inclusive — C. E. Nichols, Engineer, Stone & Webster, Inc., Boston.

Stresses, paragraph 306 — Prof. Walter C. Voss, Massachusetts Institute of Technology.

General Discussion — R. R. Zippodt, Engineer, Portland Cement Association.

Thirteen members of the audience expressed opinions and asked questions in the forum which followed.

After a rising vote of thanks for the speakers the meeting adjourned at 8.35 P.M.

The attendance was 190. Several people from outside Massachusetts came to the meeting.

NORMAN P. RANDLETT, *Clerk.*

APPLICATIONS FOR MEMBERSHIP

[April 20, 1929]

THE By-Laws provide that the Board of Government shall consider applications for membership with reference to the eligibility of each candidate for admission and shall determine the proper grade of membership to which he is entitled.

The Board must depend largely upon the members of the Society for the information which will enable it to arrive at a just conclusion. Every member is therefore urged to communicate promptly any facts in relation to the personal character or professional reputation and experience of the candidates which will assist the Board in its consideration. Communications relating to applicants are considered by the Board as strictly confidential.

The fact that applicants give the names of certain members as reference does not necessarily mean that such members endorse the candidate.

The Board of Government will not consider applications until the expiration of fifteen (15) days from the date given.

For Admission

COLBURN, CARLTON BOYCE, Brighton, Mass. (Age 21, b. Allston, Mass.) Graduate of Mechanic Arts High School and now a student at Northeastern University. During the co-operative period has been employed by the city of Newton as transit-

man. Refers to *W. J. Alcott, Jr., H. B. Alword, A. E. Colvin, Frank Heaney, J. W. Ingalls.*

FORSRLIND, ELMER ELIAS, Everett, Mass. (Age 21, b. Everett, Mass.) Is a student at Northeastern University, and during co-operative periods has been employed by Boston & Maine Railroad; Standard Oil Company of New York; Eastern Massachusetts Street Railway Company; County of Middlesex, etc. Refers to *H. B. Alword, C. O. Baird, G. B. Gee, G. A. Haskins, J. W. Ingalls.*

GOLDBERG, ALBERT, Chelsea, Mass. (Age 20, b. Boston, Mass.) Is at present a member of senior class at Lowell Institute. Has been employed by M. A. Reidy, doing some structural designing, drafting and general office work. Refers to *H. C. Cook, W. H. Lawrence, W. H. McGinness, Dean Peabody, Jr.*

HERRICK, EARLE FOSTER, Beverly, Mass. (Age 21, b. Beverly, Mass.) Is a student at Northeastern University, and during co-operative periods has been employed by Bradford & Weed, Civil Engineers, of Lynn, as rodman and transitman; and by the Boston & Maine Railroad. Refers to *W. J. Alcott, Jr., H. B. Alword, A. E. Colvin, J. W. Ingalls, G. H. Melcher.*

HILTON, WILLIAM BARNETT, Danvers, Mass. (Age 22, b. Danvers, Mass.) Is a student at Northeastern University and has been employed by the following firms during co-operative periods: city engineer, Lynn; Boston & Albany Railroad; Turner Construction Company; Malden-Melrose Gas Light Company; Bradford & Weed, Lynn; Gilbert Construction Company; Aspinwall & Lincoln and Eastern Massachusetts Street Railway Company. Refers to *H. B. Alword, C. O. Baird, G. B. Gee, J. W. Ingalls.*

HOLDEN, HOWARD CLINTON, Middleborough, Mass. (Age 57, b. Barre, Vt.) Graduate of Norwich University. Professional experience includes the following: rodman with Central Vermont Railroad; transitman with French & Bryan, Brookline; general engineering and topographical survey of Blue Hill Reservation; transitman in charge of survey party for Boston & Maine Railroad; chief of party with Boston, Revere Beach & Lynn Rail-

road; Massachusetts Highway Commission. Since December, 1923, has been District Engineer for Department of Public Works, having charge of construction and maintenance of highways in District 7. Refers to *R. W. Coburn, A. W. Dean, L. M. Hersum, E. N. Hutchins, J. W. Lawrence.*

KERINS, CHARLES, West Medford, Mass. (Age 22, b. Malden, Mass.) Is a student at Northeastern University and during co-operative periods has been rodman with F. A. Barbour Company; transitman with Dana F. Perkins, Reading; inspector of Falmouth Water Department, while employed by George A. Griffin; is now employed by Malden Electric Company as draftsman. Refers to *W. J. Alcott, Jr., H. B. Alvord, C. O. Baird, J. W. Ingalls.*

RANDALL, HERBERT ELVIN, JR., Brockton, Mass. (Age 21, b. Brockton, Mass.) Is a student at Northeastern University. Refers to *H. B. Alvord, C. O. Baird, J. W. Ingalls, W. E. Nightingale.*

SHORT, ALBERT WILLIAM, Dorchester, Mass. (Age 31, b. Newcastle on Tyne, Eng.) Is at present taking a course at Lowell Institute. From 1919-20 was employed in Newcastle, England, on ship building; 1921-23, with Michison & Co.; 1923-24, by Babcock & Davis, South Boston; 1924-25, with Simplex Electric Heating Company, Cambridge; 1925-26, with George Lawley & Son, Neponset; 1926-27, with Bethlehem Shipbuilding Corporation; 1927 to date, with George Lawley & Son. Refers to *H. C. Cook, W. H. Lawrence, W. H. McGinness, Dean Peabody, Jr.*

For Transfer from Grade of Junior

AMO, KARL HERMAN, Allston, Mass. (Age 27, b. Allston, Mass.) Graduate of Northeastern University. While at the University worked as rodman, transitman and chief of party. In August, 1923, entered the employ of the Boston Bridge Works, installing drawbridge operating machinery; later, in 1924, worked on the

erection end of bridges, doing work of bridgeman, timekeeper, field engineer, assistant foreman, and is now bridge erection foreman and engineer. Refers to *Henry Brask, J. D. Campbell, H. M. Chadwick, J. C. Moses.*

COHEN, MORRIS, Dorchester, Mass. (Age 30, b. Roxno, Russia.) Entered Massachusetts Institute of Technology in 1921; transferred to Northeastern University in 1922 and graduated in 1926. During co-operative periods worked with several architects and civil engineers. In June, 1926, entered the employ of Massachusetts Department of Public Works and is still employed there. Refers to *H. B. Alvord, C. S. Ell, J. W. Ingalls, W. E. Nightingale.*

RICE, PERCIVAL S., Urbana, Ill. (Age 26, b. Boston, Mass.) Graduate of Massachusetts Institute of Technology, 1923. Since then has been employed as draftsman by Stone & Webster, Pennsylvania Railroad, J. R. Worcester & Co., and American Bridge Company. Took a course at Harvard Graduate School and is now assistant in psychology department, University of Illinois. Refers to *J. B. Babcock, C. B. Breed, G. K. French, J. W. Howard, C. M. Spofford.*

SHIELDS, WILFRED HENRY, Dorchester, Mass. (Age 29, b. Dorchester, Mass.) Graduate of Northeastern University in June, 1925; since then has been employed by E. A. Graustein, to November, 1925, as transitman; from November, 1925, employed by the Boston & Albany Railroad, first as transitman, then as draftsman. Refers to *H. B. Alvord, E. A. Graustein, J. W. Ingalls, W. E. Nightingale.*

SMITH, SYDNEY, Saugus, Mass. (Age 29, b. Schenectady, N. Y.) Graduate of Tufts Engineering School in 1922. With the Boston & Maine Railroad, 1922-23; bridge department, Department of Public Works, 1923-25; to date, with Associated Factory Mutual Fire Insurance Company, fire prevention engineering. Refers to *Robinson Abbott, W. J. Alcott, Jr., S. L. Conner, F. H. Morris.*

NEW MEMBERS

Members

BACKES, WILLIAM J., 2 Wolcott Terrace,
Winchester, Mass.
RUSSELL S. HARMON, 45 Peterborough
Street, Boston, Mass.
ALBERT HAERTLEIN, Pierce Hall, Harvard
Engineering School, Cambridge.
MYRON H. SMITH, 406 Marlborough
Street, Boston, Mass.

Juniors

JOHN H. HARDING, 45 Peterborough
Street, Boston, Mass.
WALLACE O. LINDQUIST, 358 Burncoat
Street, Worcester, Mass.
HOWARD F. LORD, 64 Garland Street,
Chelsea, Mass.
VERNON L. STONE, 153 Naples Road,
Brookline, Mass.
ABRAHAM WOOLF, 16 Fowler Street,
Dorchester, Mass.

ANNUAL REPORTS

Report of the Board of Government for the Year 1928-29

BOSTON, March 20, 1929.

To the Boston Society of Civil Engineers:

Pursuant to the requirements of the By-Laws, the Board of Government presents its report for the year ending March 20, 1929.

Membership

Eighty-seven members in all grades have been added during the year, of whom 6 were former members reinstated. Thirteen juniors have been transferred to the grade of member.

During the year 18 members have died, 12 have resigned, 37 have forfeited membership for non-payment of dues, and 7 juniors have forfeited membership through failure to transfer to a higher grade of membership after having reached the age of twenty-six, making the total deductions 74.

The present membership of the Society consists of 6 honorary members, 849 members, 165 juniors, 21 associates, and 2 members of the Sanitary Section only, making a total membership of 1,043, a net gain for the year of 13.

Deaths

The loss by death during the year has been 18, as follows:

Frederick W. Huntington, November 19, 1927.
George A. Smith, January 16, 1928.
Edward Francis Murphy, April 23, 1928.
William L. Miller, April 25, 1928.
Hezekiah Bissell, June 24, 1928.
Gilbert Scovill Vickery, July 2, 1928.
Thomas S. Burr, July 25, 1928.
Charles Henry Gannett, August 20, 1928.
Herbert Neal Cheney, September 12, 1928.
Franklin M. Miner, September 15, 1928.
John Richard Rablin, September 17, 1928.
Peter Schwamb, November 3, 1928.
Howard Cushing Thomas, December 10, 1928.
Richard Augustus Hale, December 17, 1928.
Fred B. Forbes, January 26, 1929.
Frank H. Mills, February 2, 1929.
Francis C. Tucker, February 10, 1929.
Fayette Samuel Curtis, February 15, 1929.

Remission of Dues

Under authority of By-Law 8, the Board of Government has remitted the dues of 5 members.

Exemption from Dues

Seventy-one members have been exempt from dues in accordance with By-Law 8, which provides that "a member of any grade who has paid dues for forty years, or who has reached the age of seventy years and has paid dues for thirty years, shall be exempt from further dues."

Meetings of the Society

Seven regular meetings have been held during the year, and a joint outing with the New England Water Works Association on June 26, 1928, at the New Ocean House, Swampscott. The May meeting was held jointly with the Designers Section of the Society. The April meeting was omitted on account of the meeting of the Affiliated Technical Societies of Boston on "Traffic Regulations for General Use" on April 18, 1928, and the January meeting was omitted on account of the "Aviation" meeting held by the Affiliation on February 6, 1929.

The average attendance at the meetings of the Society was 217, the largest being 400 and the smallest 120. Buffet suppers have been a feature of all the meetings.

At these meetings papers and addresses have been given as follows:

March 21, 1928. — Annual meeting. Address of the retiring President, Frank A. Marston, "A Society to be Proud of;" followed by smoker and entertainment.

May 9, 1928. — "Ice Engineering," by Dr. Howard T. Barnes, Honorary Professor of Physics at McGill University; meeting held jointly by the Society and the Designers Section, B. S. C. E.

September 26, 1928. — "Duties of the Engineer in Connection with Land Takings," a symposium with the following speakers: Henry F. Bryant, Harold K. Barrows, Arthur J. Harty and Harvey E. Weir.

October 17, 1928. — "Fast Freight Transportation," by Lawrence Richardson, Chief Mechanical Officer, Boston & Maine Railroad.

November 21, 1928. — "Engineering Geology as applied to Location of Tunnels and Dams," a symposium with the following speakers: Frank B. Fahlquist, N. LeRoy Hammond, Richard R. Bradbury, Irving B. Crosby, Frank E. Winsor, Charles Terzaghi and Frederick K. Morris.

December 19, 1928. — "Traffic Control Engineering," by Dr. Miller McClintock, Director, Erskine Bureau, Harvard University, and M. N. Halsey, Traffic Engineer, Massachusetts Department of Public Works.

February 20, 1929. — Joint meeting with the student civil engineering societies of the Massachusetts Institute of Technology, Harvard Engineering School, Tufts College and Northeastern University. "Hydro-Electric Development of the Mongaup River," by William F. Uhl of Chas. T. Main, Inc., with discussion by Harold K. Barrows, Arthur C. Eaton, Howard M. Turner and Edward A. Graustein.

Sanitary Section Meetings

The Sanitary Section has held four meetings during the year, with an average attendance of 38. On June 6, 1928, an excursion was made to the garbage disposal plant on Spectacle Island, and to the sewage pumping stations at Nut Island and Deer Island. The following papers have been presented:

March 7, 1928. — Annual meeting. "Colloids and their Physical Properties," by Dr. Charles Terzaghi of Massachusetts Institute of Technology.

October 3, 1928. — "Summer Camp Sanitation," by Dr. Elmer W. Campbell, Director of Sanitary Engineering, State Department of Health of Maine.

December 5, 1928. — "Sludge Digestion," by Dr. Willem Rudolfs, Chief, Department of Sewage Disposal, New Jersey Agricultural Experiment Station.

January 31, 1929. — "Discharge of Side Weirs, With and Without Baffles," by Prof. Richard G. Tyler of Massachusetts Institute of Technology.

Designers Section Meetings

The Designers Section has held eight meetings during the year, two being joint meetings, one with the main Society and one with the Highway Section. The average attendance has been 59. The following papers have been presented:

March 14, 1928. — Annual meeting. "Pile Footings," by Dr. Charles Terzaghi of Massachusetts Institute of Technology.

April 11, 1928. — "Protective Coatings for Metals," by Ernest B. Bezzzero of the E. & F. King Company, Inc., and C. E. Dickinson of the Sherwin Williams Company.

May 9, 1928. — Joint meeting with the Boston Society of Civil Engineers. "Ice Engineering," by Dr. Howard T. Barnes of McGill University.

October 10, 1928. — Joint meeting with the Highway Section. "Reconstruction of Vermont Highways and Bridges after the 1927 Flood," by Stoddard B. Bates, Herbert E. Sargent, A. J. Runnals and A. D. Bishop of the Vermont Highway Department.

November 14, 1928. — "The Design and Construction Features of the New Atlantic City Convention Hall," by Samuel L. Ware, formerly of Lockwood, Greene & Co., and R. E. Rice of the Waterproofing Company.

December 12, 1928. — "The Manufacture and Use of Brick," by L. B. Lent, Engineer of the Common Brick Manufacturers' Association, and W. G. Long, President, Brick Manufacturers' Association of New England.

January 9, 1929. — "The Elastic Load Method of Computing Deflection of Joints of Trusses," by Prof. W. M. Fife of Massachusetts Institute of Technology.

February 13, 1929. — "The Structural Design of Steel Transmission Line Towers," by H. O. Weber of the Stone & Webster Engineering Corporation, and C. A. Booker of the New England Power System.

Highway Section Meetings.

The Highway Section has held five meetings during the year, with an average attendance of 43. An inspection trip was made on September 15, 1928, which included Warren Brothers Laboratory and Shops, the new Cottage Farm bridge, and several paving jobs. The following papers have been presented:

February 23, 1928. — Annual meeting. "Application of Water Cement Ratio Method of Proportioning and Controlling Concrete on Highway Pavements," by Wallace F. Purrington, Materials Engineer, New Hampshire Highway Department.

March 28, 1928. — "The Mutual Responsibility of the Contractor and the Engineer in State Highway Construction," by Fred E. Ellis, General Contractor.

October 10, 1928. — Joint meeting with Designers Section. "Reconstruction of Vermont Highways and Bridges after the 1927 Flood," by Stoddard B. Bates, Herbert E. Sargent, A. J. Runnals and A. D. Bishop of the Vermont Highway Department.

November 27, 1928. — "Stone Block Pavements," by Clarence D. Pollock, Consulting Engineer, New York.

January 23, 1929. — "Concrete Roads — Design, Drainage and Summary of Curing Methods," by L. E. Andrews of the Portland Cement Association, New York.

Northeastern University Section Meetings

The Northeastern University Section has held five meetings during the year with an average attendance of 40; and has taken charge of two of the combined Conference meetings at Northeastern University. The following papers have been presented:

April 20, 1928. — Annual meeting. "Light Weight Concrete," by Walter C. Voss, Portland Cement Association.

October 10, 1928. — "The Engineering Features of the Lucerne-in-Maine Development," by Prof. Charles B. Breed of Massachusetts Institute of Technology.

November 6, 1928. — "Electrical Arc Welding of Structural Steel and Ornamental Iron," by P. B. Covey of the Manchester Engineering and Welding Company.

December 6, 1928. — "The Principles of Traffic Control," by Maxwell N. Halsey of the Erskine Bureau, Harvard University.

February 8, 1929. — "Bituminous Pavements," by W. H. Hogue of Warren Brothers Company.

Journal

The report of the Editor of the JOURNAL for the calendar year 1928 shows that there have been printed ten issues, containing a total of 638 pages, and an average of 1,566 copies of each issue was printed. The net cost of the JOURNAL in 1928 was \$2,554.11, or \$4 per page. The net cost in 1927 was \$2,905.31, or \$4.15 per page. The Editor calls attention to the desirability of publishing a cumulative index to cover the JOURNAL from Volume I (calendar year 1914) to date. The report of the Editor will be printed in the April JOURNAL.

Permanent Fund

The Society again authorized the use of the income of the Permanent Fund in payment of current expenses. Details concerning the fund will be found in the Treasurer's report.

FitzGerald Fund

The present value of the fund established by a bequest from the late Desmond FitzGerald, a Past President and Honorary Member of the Society, is \$2,117.16. The income from this fund is to be used for charitable and educational purposes. No appropriations have been made from this fund during the year.

Freeman Fund

Kenneth C. Reynolds and Samuel Shulits have held Freeman Fund Traveling Scholarships during the year. The scholarships provide for a year's study and work in the European Hydraulic Laboratories. Mr. Reynolds also held this scholarship during the year 1927-28. No other appropriations have been made from this fund during the year.

Tinkham Memorial Fund

The "Samuel E. Tinkham Fund," established at the Massachusetts Institute of Technology by the Society, "to assist some worthy student of high standing to continue his studies in civil engineering," had a value of \$2,392.98 on June 30, 1928. The annual income from this fund is about \$125. Mr. Gordon R. Williams of Brookline, Massachusetts, a student in civil engineering in the class of 1929 at Technology, has been awarded this scholarship for the year 1928-29.

Attention is called to the fact that the tuition at the Massachusetts Institute of Technology is now \$400 per year, whereas the income from the Tinkham Fund is about \$125. Additional donations to this fund would make it of greater service for the purpose for which it was established.

Desmond FitzGerald Medal

The Board of Government has adopted the recommendation of the Desmond FitzGerald Medal Committee that no award be made this year.

Section Prizes

The Board voted on April 12, 1924, "to present a prize for a worthy paper given in each Section by a member of that Section," this award to consist of books suitably inscribed. The Board has adopted the recommendation of the special committee on the Sanitary Section award, and has voted that a prize be awarded this year, as follows:

Sanitary Section. — To Frank A. Marston for his paper on "Progress in Sewage Treatment Abroad," presented before the Sanitary Section on December 7, 1927, and published in the June, 1928, JOURNAL.

Clemens Herschel Award

Clemens Herschel, Past President and Honorary Member of the Society, has continued his gift of copies of his book on "Frontinus and the Water Supply of the City of Rome," with the request that the Board award one or more of these books each year as prizes for papers which have been particularly useful and commendable, and worthy of grateful acknowledgment.

The Board has voted to present at this time a copy of this book to Dr. Willem Rudolfs for his paper on "Sludge Digestion" presented before the Sanitary Section on December 5, 1928, and published in the January, 1929, JOURNAL; and a copy to Edward H. Cameron for his paper on "Engineering Features of a Modern Glass Bottle Plant," published in the June, 1928, JOURNAL.

Sections

Twenty-two meetings and two inspection trips were held by the sections of the Society during the year. The Northeastern University Section has been particularly active. A wide range of subjects has been covered and the meetings well attended. This year most of the papers were presented by non-members, with the result that the Sanitary Section was the only one in which a paper was eligible for a section prize award, these prizes being restricted to papers presented before a section by a member of that section. It is suggested that special effort be made during the coming year to get more papers by section members, and to arrange at least one meeting in each section for the presentation of such papers. The informality of the section meetings is one of their most desirable features, and the presentation and discussion of papers in these groups by the members themselves is worthy of particular attention.

Social Activities

Buffet suppers and smokers have been held before the meetings of the Society, and the members of the Social Activities Committee deserve much credit for their labors in connection with these meals. The work of serving the food promptly is so great that the Committee does not have an opportunity to introduce the members and thus promote acquaintanceship. It is hoped that some scheme may be devised to further these aspects of our smokers so that the newer members will have an opportunity to increase their contacts in the Society.

Library

The report of the Committee on Library contains a complete account of the library activities during the year. Particular attention is called to its recommendation that a careful study be made in order to determine what material might be removed from the shelves in order to release space needed for the more recent publications which receive the greatest use.

Society Activities

The membership of the Society is now 1,043, the largest in its history. The Committee on Membership and Publicity has devoted its attention principally to securing new members. The chairman of that committee believes that more attention should be devoted to publicity during the coming year.

The Society has co-operated with the Affiliated Technical Societies of Boston in its program, and many members of the Society have served on Affiliation committees.

During the past year there have been two special committees at work, — the Committee on Subsoils of Boston, which has continued its excellent work of securing and making available information about foundation conditions in Boston and vicinity, and the Flood Committee, which is collecting and analyzing data relative to the New England Flood of November, 1927, the report of which will be available in a short time.

Your Board, in conclusion, wishes to express its appreciation of the excellent work done by officers of the Sections and by the committees of the Society.

For the Board of Government,

CHARLES B. BREED, *President.*

Report of the Treasurer

BOSTON, March 1, 1929.

To the Boston Society of Civil Engineers:

Your Treasurer presents the following report for the year ending March 1, 1929.

Detailed data are contained in the appended tabular statement: Table 1 gives the Receipts and Expenditures for the year; Table 2, Comparative Balance Sheet; Table 3, Investment of the Permanent Fund, Turner Fund, Freeman Fund and FitzGerald Fund.

The Current Expenses for the year amount to \$11,198.26, being \$311.02 less than for the preceding year.

There has been transferred to the Current Fund all the income of the Permanent Fund for the current year, \$2,403.72.

The net expenses of the JOURNAL have been \$1,030.21 less than last year. The income from advertisements increased \$360, and the sale of JOURNALS and reprints has been \$58.68 more than last year.

There has been a decrease in the Permanent Fund of \$1,473.89 after transferring

the income for the current year of \$2,403.72 to the Current Fund, owing principally to the loss on bonds of the Milford & Uxbridge St. Ry. Co.

The Freeman Fund has increased \$130 as to principal. The accumulated income amounts to \$1,762.79.

Respectfully submitted,

F. O. WHITNEY, *Treasurer.*

TABLE 1. — RECEIPTS AND EXPENDITURES

Current Fund

Receipts

Members' dues	\$7,635 02
Advertisements	1,257 00
Sale of JOURNALS and reprints	373 02
Library fines	18 58
Income from Permanent Fund	2,403 72
	\$11,687 34

Expenditures

JOURNAL:	
Printing	\$3,056 91
Incidentals	46 77
Reprints	194 51
Editor	450 00
	\$3,748 19
Rent, meetings	223 95
Salaries (except Editor)	323 75
Printing, stationery, postage, etc., meetings	389 91
Printing, stationery, postage, etc., office	344 82
Incidentals, office	73 02
Reporting meetings	76 45
Stereopticon, meetings	42 75
Binding (net)	200 85
Insurance	31 14
Periodicals	187 02
Annual meeting	168 48
Social activities (net)	422 86
Affiliated Technical Societies of Boston	4,451 25
Designers Section	106 94
Sanitary Section	112 46
Highway Section	42 55
Northeastern University Section	48 68
Prizes	15 60
Library	117 80
Badges (net)	19 00
Deficit March 1, 1928	60 79
	11,198 26
Balance	\$489 08

Permanent Fund*Receipts*

Balance March 1, 1928	\$1,927 25
Interest received (net)	1,518 81
Entrance fees	650 00
Railway & Light Securities Co., bonds called	3,090 00
Milford & Uxbridge St. Ry. Co., bonds paid	728 61
	<u>\$7,914 67</u>

Expenditures

Lynn Five Cent Savings, deposited	\$3,000 00
American Tel. & Tel. Co., stock	500 00
Amer. Tel. & Tel. Co., right purchased	12 53
Co-operative banks (net)	319 74
Income transferred to Current Fund	2,403 72
	<u>6,235 99</u>
Balance March 1, 1929	\$1,678 68

Edmund K. Turner Fund*Receipts*

Balance March 1, 1928	\$48 35
Interest on bond	50 00
	<u>\$98 35</u>

Expenditures

Books purchased	\$73 18
Balance March 1, 1929	25 17
	<u>\$98 35</u>

John R. Freeman Fund

PRINCIPAL

Receipts

Duquesne Light Co., stock called	\$1,150 00
Cons. Gas, Electric Light & Power Co., of Baltimore, stock called	1,250 00
Puget Sound Power & Light Co., called	1,100 00
Niagara Falls Power Co., called	1,100 00
	<u>\$4,600 00</u>

Expenditures

Pacific Gas & Electric Co., 4 shares com.	\$100 00
American Superpower Corp., 20 shares	1,940 00
Allied Power & Light Corp., 10 shares pf.	} 1,050 00
Allied Power & Light Corp., 10 shares com.	
Southern Calif. Edison Co., 4 shares com.	100 00
New England Power Assoc., 10 shares pf.	970 00
Deficit March 1, 1928	110 34
	<u>4,270 34</u>
Balance March 1, 1929	\$329 66

INTEREST

Receipts

Balance March 1, 1928	\$2,857 07	
Dividends received (net)	1,760 87	
		\$4,617 94

Expenditures

Traveling scholarship	\$2,734 90	
Miscellaneous expenses	120 25	
Balance March 1, 1929	1,762 79	
		\$4,617 94

Desmond FitzGerald Fund*Receipts*

Cash March 1, 1928	\$12 16	
Interest on bonds	100 00	
Cash March 1, 1929		\$112 16

TABLE 2. — COMPARATIVE BALANCE SHEET

	March 1, 1926	March 1, 1927	March 1, 1928	March 1, 1929
<i>Assets</i>				
Cash	\$2,163 79	\$6,085 24	\$4,673 70	\$4,397 54
Bonds and notes	32,835 00	28,997 50	32,007 50	26,065 00
Stock	28,683 11	27,972 80	28,892 35	29,094 88
Co-operative banks	13,598 20	14,966 10	15,210 75	16,328 60
Savings bank	—	—	—	3,087 80
Library	7,500 00	7,500 00	7,500 00	7,500 00
Furniture	2,405 11	2,405 11	2,405 11	2,405 11
	\$87,185 21	\$87,926 75	\$90,689 41	\$88,878 93
<i>Liabilities</i>				
Permanent Fund	\$48,728 76	\$48,448 76	\$49,348 76	\$47,875 87
E. K. Turner Fund	1,046 50	1,010 10	1,042 10	1,018 92
Current Funds	537 84	187 88	60 79*	489 08
Special Library Fund	200 00	—	—	—
J. R. Freeman Fund	26,667 00	28,374 90	28,437 07	27,472 79
Desmond FitzGerald	—	—	2,017 16	2,117 16
Surplus	9,905 11	9,905 11	9,905 11	9,905 11
	\$87,185 21	\$87,926 75	\$90,689 41	\$88,878 93

* Deficit.

TABLE 3. — INVESTMENT OF PERMANENT, EDMUND K. TURNER, JOHN R. FREEMAN, AND DESMOND FITZGERALD FUNDS, MARCH 1, 1929

PERMANENT FUND

	Par Value	Actual Cost	Book Value
Bonds			
American Tel. & Tel. Co., Col. Tr. 4%, 1929	\$3,000 00	\$2,328 75	\$2,737 50
Union Elec. Light & Power Co. 5%, 1932 .	2,000 00	2,050 00	2,050 00
Blackstone Valley Gas & Elec. 5%, 1939 .	2,000 00	1,995 00	1,995 00
Dayton Gas Co. 5%, 1930	2,000 00	2,000 00	2,000 00
Superior Water, Light & Power Co. 4%, 1931	4,000 00	3,347 50	3,347 50
Wheeling Electric Co. 5%, 1941	4,000 00	3,845 00	3,845 00
Economy Light & Power Co. 5%, 1956	1,000 00	990 00	990 00
Tampa Electric Co. 5%, 1933	2,000 00	2,000 00	2,000 00
Chicago & Northwestern Ry. 5%, 1987	1,000 00	1,102 50	1,102 50
Public Electric Light Co. 5½%, 1956	1,000 00	1,000 00	1,000 00
American Tel. & Tel. Co. 5%, 1946	1,000 00	993 75	993 75
Arkansas Water Co. 5%, 1956	1,000 00	1,005 00	1,005 00
	\$24,000 00	\$22,657 50	\$23,066 25
Stock			
34 shares Amer. Tel. & Tel. Co.	3,400 00	3,714 54	3,714 54
Total securities	\$27,400 00	\$26,372 04	\$26,780 79
Co-operative Banks			
40 shares Merchants Co-operative Bank, including interest to March		\$1,800 00	
40 shares Volunteer Co-operative Bank, including interest to January		3,757 60	
10 matured shares Merchants Co-operative Bank		2,000 00	
10 matured shares Volunteer Co-operative Bank		2,000 00	
36 shares Watertown Co-operative Bank, including interest to September		6,643 44	
4 shares Watertown Co-operative Bank, including interest to March		127 56	
			16,328 60
Lynn Five Cent Savings Bank			3,087 80
Cash			1,678 68
Total value of Permanent Fund			\$47,875 87

EDMUND K. TURNER FUND

	Book Value
American Tel. & Tel. Co. 5%, 1946, \$1,000	\$993 75
Cash on hand	25 17
Total	\$1,018 92

JOHN R. FREEMAN FUND

	Book Value
10 shares New England Power Co. pf. 6%	\$960 00
10 shares New England Power Assoc. pf. 6%	970 00
10 shares Allied Power & Light Corp. pf. 5%	1,050 00
10 shares Allied Power & Light Corp. com.	
10 shares Carolina Power & Light Co. 7%	1,020 00
20 shares Amer. Super. Power Corp. pf. 6%	1,940 00
14 shares Georgia Power Co. pf. 6%	1,143 33
10 shares Alabama Power Co. pf. 7%	980 00
10 shares Electric Power & Light Co. pf. 7%	1,000 00
10 shares Tenn. Electric Power Co. pf. 7%	950 00
10 shares West Penn. Power Co. pf. 7%	1,030 00
10 shares Minn. Power & Light Co. pf. 7%	980 00
10 shares Miss. River Power Co. pf. 6%	900 00
10 shares Southwestern Power & Light Co. pf. 7%	980 00
10 shares Utah Power & Light Co. pf. 7%	990 00
40 shares Pacific Gas & Electric Co. pf. 6%	932 02
44 shares Pacific Gas & Electric Co. com. 8%	1,148 77
10 shares Great Western Power Co. pf. 7%	990 00
40 shares Southern Calif. Edison Co. pf. 8%	1,161 22
4 shares Southern Calif. Edison Co. com. 8%	100 00
10 shares Northwestern Elec. Co. pf. 7%	980 00
10 shares Consumers Power Co. pf. 6%	1,020 00
30 shares Montreal Light, Heat & Power Co. com. \$2	1,200 00
30 shares Penn. Gas & Electric Light Co. pf. 7%	2,955 00
	\$25,380 34
Cash, principal	329 66
	\$25,710 00
Accumulated interest	1,762 79
Total	\$27,472 79

DESMOND FITZGERALD FUND

	Par	Book Value
Bonds		
Southwestern Gas & Electric Co. 5%, 1957	\$1,000 00	\$1,000 00
Central Power & Light Co. 5%, 1956	1,000 00	1,500 00
	—	\$2,005 00
Cash on hand	—	112 16
Total		\$2,117 16

REPORT OF AUDITING COMMITTEE FOR THE YEAR 1928-29

MARCH 16, 1929.

We have examined the accounts of the Treasurer of the Boston Society of Civil Engineers and find the books correctly kept and the various expenditures of the past year supported by duly approved receipts.

The Treasurer has also accounted to us for the investments and cash on hand, as submitted by the above report.

EDWARD H. CAMERON,
HARRISON P. EDDY, Jr.,

*Auditing Committee of Directors of the
Boston Society of Civil Engineers.*

Report of the Secretary

BOSTON, MASS., March 20, 1929.

JOHN B. BABCOCK, Secretary, *in account with the* BOSTON SOCIETY OF CIVIL ENGINEERS, *Dr.*

For cash received during the year ending March 20, 1929:

From entrance fees, new members and transfers:

36 new members and associates at	\$10 00	.	.	.	.	\$360 00
45 juniors at	5 00	.	.	.	.	225 00
13 juniors transferred to members at	5 00	.	.	.	.	65 00

Total from entrance fees	.	.	.	.	.	.	.	\$650 00
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From annual dues for 1928-29, including dues from new members \$7,518 02

From back dues 74 00

From dues for 1929-30 43 00

Total from dues	.	.	.	.	.	.	.	7,635 02
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From advertisements 1,257 00

From sale of JOURNALS 242 25

From reprints 130 77

From library fines 18 58

From sale of badges 198 00

From binding JOURNALS 52 00

From Social Activities Committee (smokers) 403 61

\$10,587 23

The above amount has been paid to the Treasurer, whose receipts the Secretary holds.

The appended table shows the estimated and the actual expenditures for the year.

JOHN B. BABCOCK, *Secretary.*

COMPARISON OF ESTIMATED AND ACTUAL EXPENDITURES, 1928-29

<i>Office:</i>	Estimated Expenditures	Actual Expenditures	
Salaries (except Editor)	\$375 00	\$323 75	
Insurance and Treasurer's bond	35 00	31 14	
Stationery, printing and postage	350 00	344 82	
Incidentals	135 00	73 02	
Periodicals and binding	380 00	387 87	
Library	150 00	117 80	
Prizes	20 00	15 60	
Total	<u>\$1,445 00</u>	<u>\$1,294 00</u>	
<i>Meetings:</i>			
Rent	\$220 00	\$223 95	
Stereopticon and reporting	100 00	119 20	
Printing and postage (net)	400 00	389 91	
Social activities (net)	300 00	422 86	
Annual meeting, 1928	175 00	168 48	
Total	<u>1,195 00</u>	<u>1,324 40</u>	
<i>Journal:</i>			
Editor's salary and expenses	\$500 00	\$496 77	
Printing and postage	3,200 00	3,056 91	
Reprints (net)	150 00	63 74	
Total	<u>3,850 00</u>	<u>3,617 42</u>	
Sections	260 00	310 63	
Dues to Affiliated Technical Societies of Boston	4,452 00	4,451 25	
Total	<u>\$11,202 00</u>	<u>\$10,997 70</u>	

REPORT OF AUDITING COMMITTEE FOR YEAR 1928-29

BOSTON, March 20, 1929.

We have examined the records and accounts of the Secretary of the Boston Society of Civil Engineers and have satisfied ourselves that they are properly kept, and that the money received has been transferred to the Treasurer.

HARRISON P. EDDY, Jr.,

EDWARD H. CAMERON,

*Auditing Committee of Directors of the
Boston Society of Civil Engineers.*

Report of the Editor

BOSTON, February 9, 1929.

To the Board of Government, Boston Society of Civil Engineers:

The Editor submits the following report for the calendar year 1928 (Volume XV of the JOURNAL).

During the year 1928 there have been published twenty papers and discussions, twenty-two items "of general interest" and seven memoirs of deceased members.

The ten issues of the JOURNAL contained a total of 638 pages; an average of 1,566 copies of each issue were printed. The net cost was \$2,554.11, as compared with \$2,905.31 for the preceding year. Table 1 includes a comparison of costs for the JOURNAL from 1924 to 1928, inclusive. In Table 2 details of cost for Volume XV of the JOURNAL for the calendar year 1928 are shown.

The January, 1928, issue of the JOURNAL contained an article on the "Application of Laboratory Research to the Study of Hydraulic Problems," by Dr. George H. de Thierry, and gave a description of the experimental work in Europe. Work similar to this is being done by the holders of the Freeman Fund Traveling Scholarship.

The December issue of each volume contains the Contents and Index for the year, but no cumulative index has been published since the JOURNAL was started in 1914. Last year the Editor recommended that such an index be published in order to increase the permanent value of the JOURNAL. The Editor wishes to repeat this recommendation, and hopes that the Committee on Publication will give it careful consideration.

Respectfully submitted,

WALDO F. PIKE, *Editor.*

TABLE 1. — COMPARISON OF COSTS OF JOURNAL, 1924 to 1928, INCLUSIVE

YEAR	Vol.	Number of Pages*	GROSS COST †		NET COST ‡		Number of Cuts and Inserts
			Total	Per Page	Total	Per Page	
1924	XI	752	\$3,676 09	\$4 89	\$2,531 84	\$3 37	39
1925§	XII	626	3,816 45	6 10	2,485 90	3 97	146
1926§	XIII	606	4,045 13	6 68	2,652 71	4 38	132
1927§	XIV	700	4,155 56	5 94	2,905 31	4 15	121
1928§	XV	638	4,143 38	6 49	2,554 11	4 00	150

* Includes Advertising Section and Annual Index.

† Gross cost includes editing, printing, mailing and reprints.

‡ Net cost equals gross cost less amounts received for advertising, subscriptions and sale of JOURNALS.

§ Costs per page for 1925 and following years not comparable with those of preceding years, due to change in column width and number of lines per page.

Report of the Library Committee, 1928-29

BOSTON, March 20, 1929.

To the Boston Society of Civil Engineers:

The Librarian submits, for the Library Committee, the following report for the year 1928-29:

During the year 377 books have been loaned to members of the Society, or to members of other societies included in the Affiliated Technical Societies of Boston; and fines amounting to \$18.58 have been collected.

The following books have been contributed to the Library: "Elements of Machine Design," Hoffman & Scipio; "Steel Construction Handbook," A. I. S. C.; "Corrosion Causes and Prevention," Speller; "American Sewerage Practice," Vol. 1, Metcalf & Eddy; and "Hydraulic Laboratory Practice," Freeman.

A complete list of books added since the last report is appended. Among the books purchased this year were new editions of a number of standard texts in the civil engineering field. A section on "Building Codes" was established a few years ago, and considerable care is taken to keep these publications up-to-date.

Each year the problem of finding space in the library for the newly bound volumes of periodicals and transactions is more serious, and at the present time it is necessary to secure more shelf room for these bound volumes. Since it is not feasible to enlarge the library and reading room, the only alternative appears to be the removal of some of the bound volumes, either by taking out certain sets of the less used publications, or, as an alternative, giving up the earlier years of a number of periodicals. The Library Committee believes that this matter should be studied promptly. It is suggested as a first step that data be obtained as to which libraries in Boston carry those publications which we might desire to remove from our shelves. Plans have been under consideration for several years by a group of librarians, looking toward the establishment of a joint storage library where early volumes of periodicals could be maintained, but this has not matured as yet. Such a development would be of considerable value to us.

The Affiliated Technical Societies of Boston has recently been making a study of possible quarters at other locations. Any change in location of our library would probably result in a decrease of space available for library shelves, owing to the higher rentals per square foot in the more modern buildings.

In view of the necessary work to be done next year in library rearrangements, your Committee recommends that a larger committee be appointed, and that a Librarian be appointed who is not also Secretary of the Society, as it is believed that the work involved warrants having these positions filled by two different persons.

Respectfully submitted,

For the Library Committee,

JOHN B. BABCOCK, *Librarian*.

BOOKS ADDED TO THE LIBRARY, 1928-29

Elements of Machine Design. Hoffman & Scipio.*
 Steel Construction Handbook. A. I. S. C.*
 Corrosion Causes and Prevention. Speller.*
 Concrete, Plain and Reinforced. Taylor, Thompson & Smulski.
 American Sewerage Practice, Vol. 1. Metcalf & Eddy.*
 Hydraulic Laboratory Practice. Freeman.*
 Structural Engineers Handbook. Ketchum.
 Water Purification. Ellms.
 Surveying, Theory and Practice. Davis, Foote & Rayner.
 Concrete Engineers Handbook. Hool & Johnson.
 Elements of Highway Engineering. Blanchard & Morrison.
 Reinforced Concrete Construction. 3 vols. Hool.
 Handbook of Hydraulics. King.
 Building Estimator's Reference Book. Walker.
 Physics. Duff, Lewis, Carmen & Knipp.
 Elements of Hydrology. Meyers.
 Architectural Construction. Vol. 2, books 1 and 2. Voss & Varney.
 Ice Engineering, Barnes.

Report of Committee on Social Activities

BOSTON, MASS., March 20, 1929.

To the Boston Society of Civil Engineers:

The Committee on Social Activities submits the following report for the year 1928-29.

During the past year the Committee has served approximately 1,050 members and guests at seven monthly meetings, including the Affiliation meeting which was held in April. This averages 150 served at each meeting, which is slightly less than the average for previous years.

At the February meeting, when the Society was host to the Student Engineering Societies of Northeastern University, Massachusetts Institute of Technology, Tufts and Harvard, 290 members and guests were served suppers, which is the largest number served at any meeting during the year. The smallest number served at any meeting was 75.

The June meeting, which was a joint outing with the New England Water Works Association, was held at the New Ocean House in Swampscott. A ball game in the morning and a program of sports and contests, which was held after dinner, were enjoyed by a great many.

An interesting entertainment program has been arranged for this evening, and we hope that the members and guests will enjoy it as much as they have enjoyed previous programs. It is rather difficult to have something unusual each year, but we have tried to plan something interesting and different from other years.

The co-operation of members in sending in their return cards has been very gratifying to the Committee, with the exception of the meeting which was held in November. At this meeting the number served was greatly in excess of the number of return cards received, and it was necessary to delay the meeting and send for additional supplies.

* Gift.

It is quite probable, however, that the additional number of guests present at this meeting were responsible for the discrepancy between the number of return cards received and the number who asked to be served.

The increase in charges for the buffet suppers, which was inaugurated this year, — thirty-five cents for members, and fifty cents for guests, — appears to be justified and satisfactory to all parties concerned, and has helped to lessen the burden on the treasury.

The members of the Committee have devoted a great deal of time and hard work to the activities of the Society, and they are worthy of praise for their efforts. The Committee wishes to express its appreciation to the members of the Society for their helpful assistance, and especially to the Secretary of the Society, who, through his willingness to assist and advise, has made possible the success of these meetings.

Respectfully submitted,

GEORGE A. HASKINS, *Chairman.*

Report of the Committee on Subsoils of Boston

BOSTON, March 20, 1929.

To the Boston Society of Civil Engineers:

This Committee has continued the work of collecting soil-boring reports with a purpose of rounding out its knowledge of soil conditions in and near Boston.

Copies of approximately 325 new borings have been obtained in the past year, many of which are located in Boston proper.

Most of these copies were obtained from borings made by the Gow Company, Inc., and B. F. Smith Company in the early part of last year.

Thanks are due these companies for their assistance in this matter.

The total number of borings collected since the appointment of the Committee is now about 3,625.

Copies of these boring records are on file in the Society rooms, together with five maps showing their locations.

Copies of contour maps made by a member of the Committee, Mr. I. B. Crosby, showing, respectively, "Bedrock Surface under Boston" and "Boulder Clay Surface under Boston," have also been placed in the Society rooms for reference.

Due to having such a large amount of information obtained from borings, together with Mr. Crosby's work, the Committee has been able to complete the drafting of two geological vertical sections of Boston, and these have also been placed in the rooms for ready reference.

One of these sections is taken through the Mystic River, Bunker Hill, Beacon Hill and Telegraph Hill to Dorchester Bay. The other section is taken through Parker Hill, Roxbury, Beacon Hill, Cox Hill, Eagle Hill to Chelsea Creek.

These sections show the bedrock, boulder clay and other overlying deposits.

Other sections are being made which will probably go more into detail regarding the deposits overlying the boulder clay.

If this Committee is continued, it is its purpose to continue gathering data and to revise the above-mentioned plans and sections if the new data furnish more accurate information.

Respectfully submitted,

HARRY E. SAWTELL, *Chairman.*

Progress Report of Committee on Floods

BOSTON, March 20, 1929.

To the Boston Society of Civil Engineers:

At the time of the annual meeting last year, the chairman made the statement that the Flood Committee of the Boston Society of Civil Engineers would be able to make its report to the Society at this annual meeting; but it is now apparent that this is not possible, and the Committee wishes to have this time extended one year, or until March, 1930.

The Committee planned to wait until reports by individuals, public service corporations and societies, on particular subjects connected with this flood, had been made and published. It was felt that as so many of our Committee members were employed as engineers or as heads of departments, in making reports which might be confidential for a time and which certainly could not be used until made, the Flood Committee should wait until such reports were available before making its own report, which should be a scientific summary of all the material available from papers previously published.

A partial list of these papers follows, for which Messrs. Goodnough, Barrows, Goldthwait, Turner and Morphy have been either directly or indirectly responsible. Most of them, excepting the publications of the United States Geological Survey, were available about the first of January, and the Committee has worked as rapidly as possible since that time.

- "Rainfall in New England during storm of November 3-5, 1927," by X. H. Goodnough. *Journal New England Water Works Association*, June, 1928.
- "The Gathering of Floods in the Connecticut River System," by J. W. Goldthwait. Reprinted from the *Geographical Review*, July, 1928.
- "Report of the New England Flood of November, 1927." *Bulletin No. 308*, August, 1928, *The American Railway Engineering Association*.
- "Reconstruction of Vermont Highways." *Journal of Boston Society Civil Engineers*, December, 1928. H. K. Barrows among the contributors.
- "Report of Advisory Committee of Engineers on Flood Control." *Public Service Commission*, State of Vermont, December, 1928. J. W. Votey, Chairman, H. K. Barrows, Consulting Engineer, Harry Barker, Secretary, of the Committee.
- "Flood of November 3-5, 1927, and its Effect on the Rutland Railroad." Typewritten report by Rutland Railroad Company, L. G. Morphy, General Superintendent and Chief Engineer.
- "Flood Flow, Pemigewasset and Merrimac Rivers, November, 1927." *Public Service Company of New Hampshire*. Howard M. Turner.

The Committee has also made use of several valuable reports or publications by other than members of the Committee:

- "The Rainfall of New England," Part I, by J. Henry Webber. *Journal New England Water Works Association*, June, 1928.
- "The Rainfall of New England," Part II, Seasonal Rainfall, by J. Henry Webber. *Journal New England Water Works Association*, September, 1928.
- "The Rainfall of New England," Part III, Mean Monthly Rainfall of Southern New England, by J. Henry Webber. *Journal New England Water Works Association*, September, 1928.
- "The Rainfall of New England," Part IV, Minimum and Maximum Rainfall of Southern New England, by J. Henry Webber. *Journal New England Water Works Association*, December, 1928.

- "The Rainfall of Northern New England," by Gragg Richards. Journal New England Water Works Association, December, 1928.
- "Maximum Rainfall Probabilities in Maine." Typewritten report by George W. Mindling, Weather Bureau Office, Portland, Maine.
- "Flood Conditions in the Valley of the Merrimac River, 1927," by Col. S. W. Cheney, Corp of Engineers.
- "\$1,000,000 in Credits for Business in Vermont." The New England Council.
- "Vermont in Flood Time," by Luther B. Johnson, Randolph, Vermont, November, 1927.
- December, 1927, and September, 1928, issues of "The New Hampshire Highways," published by the New Hampshire State Highway Department, Concord, New Hampshire.
- "Connecticut River Flood at Holyoke, Massachusetts," published by Holyoke Water Power Company (November 5, 6, 1927).
- "A Brief Sketch of Flood Conditions, November 4, 5, 6, 1927." The Turners Falls Power and Electric Company.
- "Waterbury Under the Deluge," The Vermonter, published by Chas. R. Cummings, White River Junction, Vermont.
- "Stories and Pictures of the Vermont Flood, November, 1927." R. E. Atwood, Burlington, Vermont.
- "Flood Flow Characteristics," by C. S. Jarvis. American Society of Civil Engineers (Trans. Vol. 89, 1926).

The membership of the Committee remains the same as of a year ago, with the exception that Prof. A. C. Lyon of Orono, Maine, and Prof. J. W. Goldthwait of Hanover, New Hampshire, have been added to it.

Yours truly,

ARTHUR T. SAFFORD, *Chairman.*

Report of the Executive Committee of the Sanitary Section

BOSTON, March 6, 1929.

To the Sanitary Section Boston Society of Civil Engineers:

During the year, four meetings were held, the subject and speakers being as follows:

March 7, 1928. — Annual meeting. "Colloids and Their Physical Properties," by Dr. Charles Terzaghi of Massachusetts Institute of Technology; *attendance*, 45.

October 3, 1928. — Regular meeting. "Summer Camp Sanitation," by Dr. Elmer W. Campbell, Director of Sanitary Engineering, State Department of Health of Maine; *attendance*, 30.

December 5, 1928. — Regular meeting. "Sludge Digestion," by Dr. Willem Rudolfs, Chief, Department of Sewage Disposal, New Jersey Agricultural Experiment Station; *attendance*, 51.

January 31, 1929. — Regular meeting. "Discharge of Side Weirs, with and without Baffles," by Prof. Richard G. Tyler of Massachusetts Institute of Technology; *attendance*, 26.

These meetings have been preceded by informal dinners, as has been the custom during the past few years.

Excursion. — An excursion to the Garbage Disposal Plant on Spectacle Island and to the sewage pumping stations at Nut Island and Deer Island was held on the

afternoon of June 6, 1928. The boat and an excellent luncheon were furnished through the courtesy of Coleman Brothers, operators of the Garbage Disposal Plant. In spite of a rainy afternoon, twenty-five attended the excursion.

Special Committees. — A special committee was appointed by the Chairman to investigate the desirability of having a sewage operators group to become affiliated with the National Federation of Sewage Works Associations, and it reported back that it did not seem practicable for the Section to form such a group. Report was accepted and Committee discharged.

Membership. — According to the records of the Secretary of the Society, the Sanitary Section now has a membership of 202, four new members having been added during the year and thirteen having been lost, — four by forfeiture of membership, two by resignation, and seven by death. The members lost by death during the year are as follows: Herbert N. Cheney, Charles H. Gannett, Richard A. Hale, F. W. Huntington, Franklin M. Miner, George A. Smith, Howard C. Thomas.

Attendance. — The attendance of the meetings during the year has ranged from a minimum of 26 to a maximum of 51, averaging 38 per meeting.

Respectfully submitted,

For the Executive Committee,

STUART E. COBURN, *Clerk.*

Report of the Executive Committee of the Designers Section

BOSTON, March 13, 1929.

To the Designers Section, Boston Society of Civil Engineers:

During the past year six regular meetings of the Section have been held. Two joint meetings also were held, one with the Boston Society of Civil Engineers, and one with the Highway Section of the Society.

Brief summaries of these meetings follow:

March 14, 1928. — *Subject*, "Pile Footings;" *speaker*, Dr. Charles Terzaghi; *attendance*, 110. This was the annual meeting, and officers for the year to come were elected at this time.

April 11, 1928. — *Subject*, "Protective Coatings for Metals;" *speakers*, Mr. Ernest B. Bezzozero of the E. and F. King Company, Inc., and Mr. C. E. Dickinson of the Sherwin Williams Company; *attendance*, 27.

May 9, 1928. — On this date the Section held a joint meeting with the Boston Society of Civil Engineers.

October 10, 1928. — *Subject*, "Reconstruction of Vermont Highways and Bridges after the 1927 Flood;" *speakers*, Mr. Stoddard B. Bates, Commissioner of Highways, State of Vermont, Mr. Herbert E. Sargent, Chief Engineer of the Vermont Highway Department, Mr. A. J. Runnals, Road Engineer of the Vermont Highway Department, Mr. A. D. Bishop, Bridge Engineer of the Vermont Highway Department, Prof. H. K. Barrows of Massachusetts Institute of Technology, Mr. Wm. F. Williams, Commissioner of the Massachusetts Department of Public Works, and Mr. R. W. Coburn, Construction Engineer of the Massachusetts Department of Public Works; *attendance*, 72. This was a joint meeting with the Highway Section.

November 14, 1928. — *Subject*, "The Design and Construction Features of the New

Atlantic City Convention Hall;" *speakers*, Mr. Samuel L. Ware, formerly of Lockwood, Greene & Co., and Mr. R. E. Rice of The Waterproofing Company; *attendance*, 52.

December 12, 1928. — *Subject*, "The Manufacture and Use of Brick;" *speakers*, Major L. B. Lent, Engineer of the Common Brick Manufacturers' Association of America, and Mr. W. G. Long, President of the Brick Manufacturers' Association of New England; *attendance*, 35.

January 9, 1929. — *Subject*, "The Elastic Load Method of Computing Deflection of Joints of Trusses;" *speaker*, Associate Professor W. M. Fife of Massachusetts Institute of Technology; *attendance*, 50.

February 13, 1929. — *Subject*, "The Structural Design of Steel Transmission Line Towers;" *speakers*, Mr. H. O. Weber of the Stone & Webster Engineering Corporation, Mr. C. A. Booker of the New England Power System, and Mr. Sydney A. Martin (by proxy); *attendance*, 65.

Some of the papers were published in the JOURNAL of the Boston Society of Civil Engineers. Lantern slides were used at five of the meetings.

Several meetings have been announced by blueprint posters sent to offices and schools, where they could be displayed on bulletin boards. In general, the attendance at meetings promoted in this way was so satisfactory that advertising of this kind can be recommended for the future.

The average attendance at the meetings was 58.7. Last year it was 50.3. During the year 8 new members were added; 5 were dropped; 1 resigned; 1 has died. The net membership this year is 180. Last year it was 179.

Respectfully submitted,

For the Executive Committee,

NORMAN P. RANDLETT, *Clerk*.

Report of the Executive Committee of the Highway Section

BOSTON, March 20, 1929.

To the Highway Section, Boston Society of Civil Engineers:

During the past year six regular meetings of the Highway Section have been held. These meetings are summarized as follows:

February 23, 1928. — Annual meeting. Election of officers as follows: Chairman, LeRoy M. Hersum; Vice-Chairman, Leslie Wertheim; Clerk, Harold F. MacWilliams. Executive Committee, Edward S. Larned, Forrest J. Maynard, Robinson Abbott. *Speaker*, Mr. Wallace F. Purrington, Materials Engineers of New Hampshire State Highway Commission; *Subject*, "Application of the Water Cement Ratio Method of Proportioning and Controlling Concrete on Highway Pavements;" *attendance*, 56.

March 28, 1928. — *Speaker*, Fred E. Ellis; *Subject*, "The Mutual Responsibility of the Contractor and the Engineer in State Highway Construction;" *attendance*, 35.

September 15, 1928. — Highway Inspection Trip which included Warren Brothers Company Laboratory and Shops, Cottage Farm bridge, Washington Street in Dedham, and River and Oakland streets in Mattapan.

October 10, 1928. — Joint meeting with Designers Section. *Speakers*, Stoddard B. Bates, Commissioner of Highways of the State of Vermont, Herbert E. Sargent, Chief Engineer of Vermont Highway Department, A. J. Runnals, Road Engineer of Vermont Highway Department, A. D. Bishop, Bridge Engineer of Vermont Highway Depart-

ment, Prof. H. K. Barrows of Massachusetts Institute of Technology, William F. Williams, Commissioner of Public Works of State of Massachusetts, and R. W. Coburn of Massachusetts Department of Public Works; *Subject*, "Reconstruction of Highways and Bridges after the 1927 Flood;" *attendance*, 80.

November 27, 1928. — *Speaker*, Clarence D. Pollock, Consulting Engineer, New York City; *Subject*, "Stone Block Pavements; Salvaging of Old Pavements; Portland Cement Grout vs. Asphaltic Filler;" *attendance*, 21.

January 23, 1929. — *Speaker*, L. E. Andrews of the Portland Cement Association, New York; *Subject*, "Concrete Roads, Design, Drainage and Summary of Curing Methods;" *attendance*, 23.

During the year the Executive Committee has held four meetings.

Membership. — The present membership in the Highway Section is 68. During the year there have been 9 new members enrolled, while 1 has died, namely, John R. Rablin. There has been a net gain in membership of 8 for the year.

Attendance. — The attendance at meetings during the year has ranged from 21 to 80, and has averaged 43 per meeting.

Respectfully submitted,

For the Executive Committee,

ERNEST MATHERS, *Clerk*.

Report of the Executive Committee of the Northeastern University Section

MARCH 16, 1929.

To the Northeastern University Section, Boston Society of Civil Engineers:

The Northeastern University Section of Boston Society of Civil Engineers has held five meetings during the year with an average attendance of 40, and has taken charge of two of the combined Conference meetings at Northeastern University.

The following papers have been presented:

April 20, 1928. — Annual meeting. *Subject*, "Light Weight Concrete," by Walter C. Voss, Structural Engineer, Portland Cement Association.

October 10, 1928. — *Subject*, "The Engineering Features of the New State of Maine Development in Lucerne-in-Maine," by Prof. Charles B. Breed, Massachusetts Institute of Technology.

November 6, 1928. — *Subject*, "Electrical Arc Welding of Structural Steel and Ornamental Iron," by Mr. P. B. Covey of the Manchester Engineering and Welding Company.

December 6, 1928. — *Subject*, "The Principles of Traffic Control," by Maxwell N. Halsey of the Albert Russell Erskine Bureau of Harvard University.

February 8, 1929. — *Subject*, "Bituminous Pavements," by W. H. Hogue, Engineer for Warren Brothers Company, Cambridge.

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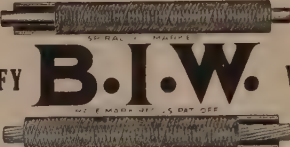
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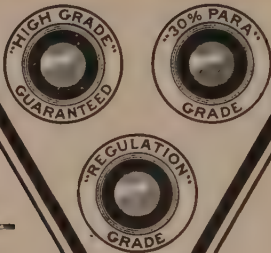
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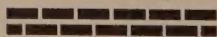
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